

THE STRUCTURE OF THE EXPERT- ANALOGY IN PLATO & ARISTOTLE

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Abstract

The expert (*technē*) analogy often plays an essential role in the arguments of Xenophon, Plato and Aristotle, and this type of argument can be traced back to Socrates. Yet there has been remarkably little work done on the argument itself. Vlastos, and to a lesser degree Robinson, interprets the majority of expert-analogies as intuitive inductions, where the conclusion is built into the concept of an expert and thus it is not an actual inference. On the other side McPherran, and to a lesser degree Santas, interprets them as probable inductions, i.e. an inference based on an insufficient number of cases or an insufficient number of similar attributes between the analogous cases, yielding a probable inference.

This thesis tries to defend a third alternative, where the expert-analogy is understood as an inference from one species to another species, the inference being valid as there is a common genus to which the attribute inferred belongs per se. Thus the analogy is interpreted to have a valid deductive structure. It is claimed that a similar analogical structure can be found in other types of proofs, e.g. the homological proof found in evolutionary biology. It is further argued that this structure can be found in Aristotle's discussion of the argument by example (*paradeigma*), and further that a justification can be found in Aristotle's four-part division of identity into that of quantity, species, genus and analogy – and it is claimed that the expert-analogy is in fact based on an identity in genus. Indications can also be found in Plato, but these were not developed further by him. And in addition, the Aristotelian principle that a proof should be at its most generic level further justifies the proposed structure of the expert-analogy. Finally this structure is used in the discussion of several controversial cases of the expert-analogy, hopefully showing that the proposed structure is applicable to the various cases and allows for an increased understanding of them.

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Preface

The following dissertation should be of interest both to those already well acquainted with parts or all of the philosophical problems discussed, but also to novices on the current subject. To draw an analogy, Isocrates in his *Against the Sophists* 14-15¹ separates those of his students with the natural ability to become excellent speakers from those of an inferior nature. Both of these types of students can benefit from education in rhetoric, and should thus become students of Isocrates. Just the same, both of my type of readers can benefit from reading this dissertation, though the reader who is already well acquainted with the issue will understand the dissertation better. But both types should read it.

All abbreviations of ancient authors and texts where available are from the list of abbreviations in Liddell & Scott. All translations of Plato are from the *Complete Works* edited by John M. Cooper, unless otherwise indicated. All translations of Aristotle are from the *Complete Works* edited by Jonathan Barnes, unless otherwise indicated. Square brackets within quotations indicate my own additions.

It has been my general policy to translate Greek words, rather than simply using the Greek words by themselves. Where necessary for clarification I have added the Greek original. The reason for this is that by giving a translation I convey the additional information to the reader of how I think the word should be translated, and thus which connotations one should have to the word.

¹ Vide Roochnik 1996: 76 ff. for a translation and discussion of this passage.

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I Introduction

There is a type of argument that is frequent in Plato's dialogues, as well as in the Socratic writings of Xenophon and Aristotle (among other works the *Nicomachean Ethics*). In fact, it is used so frequent that both Plato and Xenophon refer to this type of argument as tired and worn out. "He's always going on about pack asses, or blacksmiths, or cobblers, or tanners; he's always making the same tired old points in the same tired old words [...] But [...] you'll realize that no other arguments make any sense." (*Smp.* 221e-222a) "By the gods! You simply don't let up on your continual talk of shoemakers and cleaners, cooks and doctors, as if our discussion were about them!" (*Grg.* 491a) "[...] you will have to avoid your favourite topic,-- the cobblers, builders and metal workers; for it is already worn to rags by you in my opinion." (*Mem.* I.II.37)

Analogy is extremely frequent in the dialogues of Plato. 'As this, so that' is his refrain [...] It disappears to some extent in the later work; but the early and middle dialogues are full of it." (Robinson 1953: 205)

And again, "a very large number of the Platonic analogies, perhaps more than half, contain the notion of *techne*-episteme, which is in English the tetrad knowledge-science-art-technics." (Robinson 1953: 206) Briefly put, the expert-analogy is the paradigmatic case of an analogy for Plato, and is so frequently used that Plato (as well as Xenophon) allows himself to be ironic and make jokes about it. Yet remarkably few have discussed the logical structure of the expert-analogies. In this paper I will present an interpretation of how these expert-analogies work, and assess their logical validity. Following Robinson, one might classify the present thesis as a work in the history of logic. It does however defend a logically valid form of analogies, and in this regard it is more a work in philosophy of logic. In addition the expert-analogies were used in large part to prove a conclusion in ethics, and many of the examples discussed here will concern ethics. A reason for this might be that the expert-analogy is usually traced to the historical Socrates², and it is believed that he mainly concerned himself with ethics.

² I will not be concerned much with the historical Socrates in this thesis. Unless otherwise noted when I refer to Socrates I mean the dramatic character figuring in the Socratic dialogues of Plato and Xenophon.

There are good reasons to assume that this type of analogy has come down to us from Socrates, which can be called by the term Socratic analogy, or more specifically the expert-analogy (why it is called by this name will soon be made evident). Aristotle said that “two things may be fairly ascribed by Socrates—inductive arguments and universal definition, both of which are concerned with the starting-point of science.” (*Metaph.* 1078b27-29) Here ‘inductive arguments’ translates the Greek ἐπαγωγή, however the arguments that Aristotle must be thinking of are better viewed as analogies. But the secondary literature sometimes refers to it as ἐπαγωγή, i.e. ‘induction’, at other times as analogy.

An example of this type of argument can be found in *Men.* 90c-91b. P1: to learn to become a good physician one should go to a physician. P2: to learn to become a good shoemaker one should go to a shoemaker. P3: and the same for any other pursuits. C1: to learn an expertise one should go to those who practices the expertise, and among these to those who exact fees and have shown themselves to be teachers. P4: it would be foolish to refuse to send someone that want to learn flute-playing or the other expertise to those who profess to teach the expertise for a fee. P5: Meno longs to acquire virtue. P6: The sophists profess to teach virtue for a fee. C2: Meno should be sent to the sophists to learn virtue.

This is quite a memorable example with a striking conclusion. Now there are several obvious characteristics of this argument. Firstly, all the examples (the physician, shoemaker, etc.) are different kinds of experts (τέχναι). The word that I translate as expertise (τέχνη) can also be translated as craft, art, science, trade, profession, skill, technique, or negatively as cunning or trick. I have consistently translated this term and all its cognates as ‘an expert’ if referring to the practitioner, or ‘an expertise’ if referring to the field that the expert is a practitioner of. When quoting other commentators you will find different translations, mainly as ‘craft’ or ‘art’. I think translating it as expertise conveys the proper connotations. It is someone that is an expert on a certain field. Translating it as craft usually makes it too narrow, not fitting every case. A craft gives the connotation of a maker of physical objects of a practical nature, e.g. the shoemaker. But we will see that expertise is a much wider term than that³. Likewise art seems too narrow, and it gives the connotations of ‘fine art’, which is hardly representative for all the expertise.

Secondly, one can see from the example that the analogy proceed from a few cases of various experts, claiming that these exhibit certain attributes, namely that to learn an expertise

³ Cf. ‘I argue that for Plato “technē” does not exclusively refer to productive knowledge. Instead, it is a much more flexible term covering a wide range of different kinds of arts, sciences, and crafts.’ (Roochnik 1992: 186)

one should go to those practicing and teaching this expertise for a fee. Then one argues from these particular experts possessing these attributes, to the conclusion that a different expert also must possess these attributes, namely that the sophist also has these attributes. In other words, it is inference from one or more particulars, to another particular. But the analogy does not seem to be a straight inference from one particular to another. As Joseph puts it, this “*inference* from particular to particular works through an implicit universal principle.” (Joseph 1916: 542) In the example above the implicit principle is made explicit in C1, together with the unstated premise that virtue is an expertise. The way this is usually taken is that the particulars inductively prove the universal principle, but the particulars do not seem necessarily to justify the universal. To paraphrase Russell, the chicken’s inference that the farmer will feed him every day is not valid, as the farmer one day breaks the chicken’s neck instead. Thus, taken that way, the analogy seems problematic. And in contrast, any inference based merely on a similarity between two things, without some sort of universal principle, seems to make for a poor argument. There is simply nothing connecting the premise and the conclusion. E.g. the earth is populated, therefore the moon is populated. Taken this way, the conclusion does not follow from the premises. And again the analogy seems problematic.

I. 1 Particulars and universals, genus and differentia

At this point I want to clarify exactly what I mean with an analogy, as this word is often used equivocally. “There is no word, however, which is used more loosely, or in greater variety of senses, than analogy.” (Mill’s *A System of Logic* ch. 20 § 1.) With analogy I mean any inference from particular to particular. A particular must not be confused with a concrete – the particulars that Socrates use are not concrete examples, e.g. Sophroniscus the sculptor. Rather they are a sculptor, and the sculptor being used as a particular, viz. a case, of the universal ‘expert’. In another sense, the cases used are universals, e.g. the universal sculptor, but the cases always have a superordinate universal. To use Plato’s terminology, the analogies are all between ideas, and not between appearances. It would be a grave mistake to view the Aristotelian dichotomy of universal and particular as another variant of the Platonic dichotomy of idea and appearance⁴.

⁴ Indeed Aristotle criticises Plato for not seeing the difference. “For Aristotle’s commonest objection to the Theory of Forms is that it confuses the general with the particular.” (Owen 1978-1979: 9)

To this set of concepts must be added that of genus and species. In many respects this pair of concepts is similar to that of universal and particular. Species is equally relative, and can refer to anything from the *infima species*, the lowest order, to the second highest. It only needs a single genus to be higher than it, to be more general. Thus a concept can be a species relative to one thing, and a genus relative to another. But the genus and species stands in a very specific relation to each other, such that the genus is the natural kind of the species. It is not just that the genus is more general, but the species is defined by the genus in combination with a differentia.

I think it is now clear what I mean with universal and particular, as well as genus and species. Still it might be objected that this talk of natural kinds, of genus and species, surely must be outdated concepts by long ago. Take for instance the following criticism from Acton:

The philosopher whose attention is engrossed with abstract universals will regard the objects of the world as grouped together in classes, the members of which possess a common quality. The knowledge which he gains by means of abstract universals will thus be liable to two defects. (a) In the first place it will be confined to classes, at the expense of those groups, whose members are more closely associated than the members of a class are [...] (b) In the second place, concentration upon the common qualities of individuals is at the expense of our knowledge of the individuals themselves. (Acton 1937: 3)

I think these problems do not apply to a natural class. For these the shared attributes of the class are considerable enough, and one may of course make comparisons across classes even though these will not be as good as those that are members of the same class. To the second objection, I think it essential to see which qualities in the individual belong to it per se, and which belong per se to one of the higher genera. Seeing it as a species of a genus allows for explanations of attributes, by saying that the species has this attribute because it is a part of the genus. E.g. this isosceles has internal angles equal to two right angles, this being explained by it being a triangle. For a fuller defence of the concepts of genus and differentia see Cook Wilson 1926: 354-376. For the still critical reader, I ask you to be open-minded with my use of these concepts until the end of the thesis, and then consider if your critical remarks against the concepts still holds.

One should also have in mind the somewhat archaic definitions of induction and deduction—induction being the inference from particulars (some A is B) to universals (all A is B), deduction being the inference from universals to particulars. These two terms will be

used meaning something like that throughout this thesis. I.e. by induction I mean any inference going from the less general to the more general⁵. By deduction I mean any inference going from a general premise, and inferring a logical consequent. To a certain degree one can understand the analogy as first an induction leading to C1, then a deduction to C2. But there is much more to be said about this type of argument. And as I will suggest, the universal principle that the analogy works through can be taken to be an assumed premise, and not a conclusion induced by the first part of the analogy.

I. 2 The history of the concept of an expert, from presocratic thought to Aristotle

The concept of an expertise (τέχνη) was not developed by Socrates or Plato, rather it is a concept which already at that time had been much discussed and thus was a well-established concept. In this section I will briefly relate the different meanings of the term as used in presocratic thought, in Plato, and in Aristotle. This will be but a very rough sketch, giving us a picture of the concept. For a more thorough presentation I recommend the first chapter of Roochnik 1996, and the introduction and chapter 1 of Angier 2010.

The earliest meaning of τέχνη seems to have been to the carpenter (τέκτων), but by the time of Homer it also encompassed ship-building and smithing⁶. So already at that time every expertise had its separate goal that it worked to achieve. And it should be a beneficial goal, making the expertise useful. It also in a sense commands nature, e.g. in *Prometheus Bound*. It is a human power that stands in opposition to nature and chance. It also has a high degree of exactness, and in this respect especially geometry, being more developed at that time than arithmetic, was seen as the paradigm case of an expertise. Further the expert has a systematic grasp of his expertise, and regularly produces the goal. An expert is also thought to be one that can teach the expertise to others. And by being an authoritative expert, and being recognised as such, he can sell his services. Solon adds that an expertise can either be used for the good or for the bad⁷.

⁵ An exception here is for the term 'Socratic induction', where I follow the terminology of Robinson and the other commentators.

⁶ Cf. Angier 2010: 3.

⁷ Cf. Roochnik 1996: 30-32.

To begin with it seems that medicine was a rather controversial expertise, based on the Hippocratic writings especially *On Techne* and *On Ancient Medicine*. It has a definite goal, viz. health, which is clearly of benefit. What was seen as questionable was if medicine was able to produce this goal. The doctor did not always succeed in healing the patient, and on the other side patients sometimes got well on their own. And the doctor would often refuse seriously ill patients. The argument then was that because of this medicine is not really an expertise. But, they responded, one cannot demand higher exactness than what is appropriate for the field. Medicine could give rules, but these were still only rules of thumb. There were in addition, at least if one considers the state of the medical profession at that time, a great number of incurable diseases. Roochnik argues, perhaps convincingly, that the case of medicine represents a considerably different type of expertise, which he calls *techne*₂. Compared to geometry it falls short on many respects. Its subject matter is open to some change, it does not have strict rules, and its end is distinct from its function so that the doctor can perform his function yet fail to achieve health⁸.

Rhetoric is likewise a controversial expertise. It is defended as being similar to medicine. E.g. Gorgias says that “the effect of speech upon the condition of the soul is comparable to the power of drugs over the nature of bodies.”⁹ For Gorgias rhetoric properly orders belief (δόξα) in the soul, and since belief is the best one can aim for, rhetoric is an expertise. Isocrates’ view on rhetoric is slightly different. Roochnik argues that Isocrates thinks, though not so explicitly, that rhetoric like medicine is a *techne*₂. The subject matter is not fixed and stable, so that the rhetorician must adopt his speech to the situation. Also it is teachable, but to become a good speaker also requires a good nature and intelligence – which rhetoric cannot teach. And also, there are good orators that have not been taught rhetoric. He thinks the education also makes the students into good men, but he does not claim to teach justice. And the teacher mainly teaches through being an example (παράδειγμα), exemplifying in practice the good man.

Plato’s concept of expertise is like that of *techne*₁, and the paradigm case seems to be geometry. Still, Plato uses a very wide range of experts in his analogies, and the doctor seems to be one of his favourites. What Plato adds is a division between expertise and mere knacks (ἐμπειρίαν), the difference being that while the expertise aims for the real good, the knack only aims for the apparent good. It is not obvious if Plato himself accepts this division, but he

⁸ Cf. Roochnik 1996: 52.

⁹ *Helen* 14, quoted in Roochnik 1996: 72.

does make use of it at several places. The expert is definitely an honorary title for him, and the argument often aims to prove that some expert (the Homeric bard, the orator, the sophist, etc.) does not have a real expertise. Plato also frequently uses arguments presupposing that virtue and justice are expertise, but it is also controversial if Plato himself accepts this or only uses the argument in order to lead his opponent into a self-contradiction.

Now Aristotle develops the concept of expertise considerably. While he says that logic and rhetoric are expertise, he largely thinks that all expertise are productive (ποιέσις). He separates out the virtues and justice, not calling these expertise as they are not productive but rather practical (πρᾶξις). And both of these are separated from the theoretical sciences (θεωρία) like geometry and physics. Thus he divided the expertise into three types, and only retained the word expertise for the productive crafts, e.g. medicine, carpentry, etc.

More recently virtue-ethicists have attempted to revive the view that virtue is an expertise, in this apparently more inspired by Plato than Aristotle. E.g. Annas 1995 and Stichter 2007.

II Previous commentators on the structure of the expert-analogy

For some reason there has been remarkably little written on the structure and validity of the expert-analogy. There has been no in-depth analysis of it in Aristotle, and most commentators simply assume that it is either a proportional analogy or a weak inductive argument. The main commentators on this type of argument in Plato and Xenophon are Robinson (1953), Santas (1979) and Vlastos (1991). More recently McPherran (2007) has proposed a somewhat new interpretation, inspired by Santas¹⁰. Let us first look at Robinson:

By epagoge I mean an argument from one proposition, or from a set of coordinate propositions, either to another proposition superordinate to the premisses as the more universal is superordinate to the less universal and the particular, or to another proposition coordinate with the premisses, or first to a superordinate and thence to a coordinate proposition. ‘Women are weak and therefore men are weak’ is epagoge to a coordinate proposition. ‘Women are weak and therefore human beings are weak’ is epagoge to a superordinate. ‘Women are weak and therefore human beings are weak and therefore men are weak’ is epagoge first to a superordinate and thence to a coordinate. (Robinson 1953: 33)

As Robinson remarks, this use of induction (*ἐπαγωγή*) differs from Aristotle’s usage of the term, in that Aristotle only calls the second of these three forms induction (e.g. *Top.* I. 12). I see no harm in following Robinson’s usage of the term, and indeed other commentators have done so as well, provided it is understood that one then means Socratic *ἐπαγωγή*; however my argument in no way rests on this terminology. An alternative terminology, that Robinson also makes use of, is to call it ‘use of cases’. This is a much broader term, but confined to our present inquiry it does not seem to be misleading. This thesis is primarily a study of the expert-analogies, but these are a sub-class of Socratic induction, and are by far its most important type.

¹⁰ It might also be worth briefly to mention Graham 1991 and Warren 1989. Graham says that Plato’s “arguments show a commitment to fixed presuppositions about the crafts which he exploits to his purposes. Indeed, we can glimpse in his presuppositions a certain order which amounts to a tacit anatomy of the crafts.” (Graham 1991: 11) This is in harmony with the interpretation that I will suggest, but Graham’s presentation does not really give a clear interpretation of the structure of the expert-analogy. Thus he is of little help to our present inquiry. Now Warren is mainly concerned with the use in the *Republic*, and concludes that “Plato does not employ a craft analogy in the *Republic*; he shows us that ruling is the supreme craft among crafts.” (Warren 1989: 114) I find Warren’s conclusion quite peculiar, cf. my discussion of *R.* 444c-445b below.

However, keep in mind that Robinson includes not only analogies but also metaphors and images under this term. Later in his discussion of analogies he divides them up, but not so in his chapter on Socratic induction. Viz. the division between analogy on the one hand, on the other that of image (εἰκὼν), translated as image or simile or parable. Robinson says that an image is more vivid and persuasive, but that “it is something that cannot happen, a fairy tale.” (Robinson 1953: 208) Unlike the expert-analogies, these images are unreal, e.g. “the statue that perfectly resembles a man inside as well as without” (Robinson 1953: 208), and in addition they do not necessarily contain a universal which the two analogous cases embody, e.g. Plato’s cave. I will confine myself to discussing analogies, and will not be dealing with images.

Robinson divides Socratic induction into three types. The first is inference from particular(s) to a universal. The second is inference from particular(s) to another particular, the universal being left implicit. The third is inference from particular(s) to another particular, with an explicit universal. Robinson thinks the second of these types is an analogy. “Analogy is the kind of epagoge that passes from case to case without mentioning the universal. The less evident the universal, the more likely we are to call it analogy and not epagoge.” (Robinson 1953: 207) I do not follow Robinson on this point, since I do not think that the form and validity of the argument is changed when the universal is left unstated. Occasionally it can give interpretative difficulties when it is left unstated, i.e. in interpreting what the universal is. Provided one has a correct apprehension of the universal, the argument should be just as strong independent of whether it is implicit or explicit. Thus I am interested in both the second and third type of Socratic induction, while I am not so interested in the first type as this is not an analogy but rather a type of inductive argument.

Robinson thinks that the use of cases are both used to infer a proposition and to illustrate a proposition: “The use of cases to infer a proposition grades imperceptibly into the use of cases to illustrate a proposition; and between these two points there must be an interval where the case makes the proposition directly evident.” (Robinson 1953: 38) And again, “a line may be drawn within the continuum of the Socratic procedure from the purely inferential to the purely explanatory use of cases.” (Robinson 1953: 42) In contrast to this Vlastos thinks that it only illustrates – “exemplifying it, rather than *prove* it...” (Vlastos 1991: 268)¹¹ And on the other extreme, Santas consistently treats the analogies as inferences (vide Santas 1979:

¹¹ Another supporter of this view is McCaskey 2006, see especially page 35.

138-147). I will argue against Vlastos that most of the analogies are inferences, and especially that the analogies from the expertise are inferences.

On the form and validity of the analogies, Robinson does not have that much to say. He is of the opinion that Plato did not have a clear conception of induction, thus some of his inferences to superordinate propositions are based on probability, some on complete enumeration and some are intuitive induction, or rather they are usually based on a mixture of all three¹². Plato often use phrases like ‘by parity of reason’ (κατὰ τὸν αὐτὸν λόγον), which makes it seem only probably. I.e. one is saying that if they follow the same rule, belong the same genus, have the same form, etc. then the conclusion follows. However this argument is viewed as too weak by Robinson. “There seems to be no clear case of the conception of epagoge as merely probable in the dialogues.” (Robinson 1953: 37) Similarly Plato often says, after reviewing a few cases, that ‘the same holds for the rest’. This points toward complete enumeration (though rather one of enumerating all the species under a genus than of every particular instance). And then there are analogies where it seems as if the cases simply point towards the universal without giving any proof. I agree with Robinson that Plato (and somewhat less so with Aristotle) did not separate clearly between these three kinds. But what I want to focus on is the inference that goes from one case to another, the analogy, and not the inference to the universal, and the analogy does not face the same problems.

He first separates between two types of analogy: “(1) since this X is Y, that X is Y, (2) since this X is Y, that P is Q.” (Robinson 1953: 207) These two types correspond to what Brown calls predictive analogy and proportional analogy. In the first type the analogy is drawn between two objects or terms (X and Y), in the second the analogy is between the relation X to Y and the relation P to Q. Another interesting point that Robinson draws attention to is that the number of cases used does not affect the validity of the analogy:

Analogy seems to be essentially an argument from a single case to a single case. However many cases are available, the argument, if it is an analogy, chooses only one of them, or at any rate treats all that it takes as being for the purpose of the argument a single case. It is essentially not perfect epagoge; for that ascends to the universal. It is essentially not probable epagoge from a plurality of cases either; for it professes to be intuitive in character, to see into one thing by an insight obtained on another. (Robinson 1953: 207)

¹² Cf. Robinson 1953: 35-38.

I think Vlastos should be interpreted to be saying basically the same thing, viz. that it does not rely on the number of cases and thus is not a probable inference, with the exception mentioned above that Vlastos does not think of it as an inference and therefore that the cases plays no role in validating the analogy. He calls it an intuitive induction, and says that ‘the truth of the conclusion *is built into the meaning of its critical term* “master of a craft”’. (Vlastos 1991: 268) The conclusion is not arrived at from the number of cases cited, and one example should be enough to exemplify the critical term. At the same time, it is not something that can be empirically confirmed or falsified. The argument is based on a proper understanding of a genus, such that there cannot be a species of that genus without this attribute. E.g. “anyone who claims to be a master of a given craft but does not possess relevant knowledge superior to that of a master of some other craft or of no craft at all would be *ipso dicto* disqualified as a fake.” (Vlastos 1991: 268) Vlastos’ discussion is however very brief, and he only discusses in detail the type of Socratic induction that is not an analogy, where one infers from cases to a superordinate universal. Regarding the type going from one case to another coordinate case, where the universal is left implicit, he says that “what we have here is straightforward argument by analogy: from some cases of *C* we argue by analogy to a further case of *C*.” (Vlastos 1991: 268) This description of an analogy looks like what I want to defend, where one argues from one species of a genus to another species of the same genus. But the passage does not admit us to say anything further than that. For the type where the universal is explicit, he is equally abrupt: “here we go by epagoge to the general statement about all cases of *C* and then infer by syllogism that this would be true of this or that case of *C*.” (Vlastos 1991: 268) Here he admits that the second stage of this, the syllogism, is an inference. But Vlastos is then faced with several problems. How is this third type related to the analogical type? Vlastos gives no answer to this. And why does one have to presume that the cases works as an intuitive induction, instead of simply taking the universal as a stated premise which first are exemplified by the cases – which is my proposal.

Next let us deal with the interpretation that Santas gives, where it is a kind of probable induction. As a result of this he thinks an increase of the number of cases increases the strength (or perhaps probability) of the analogy. Because he assumes that it is an inductive argument he does not check the validity and soundness of the argument, but instead its strength.

The strength of an inductive argument depends on several factors, such as the number of instances from which the conclusion is drawn, the similarities and dissimilarities

among these instances, the known similarities between these instances and the instances in the conclusion, the known relations, if any, among the properties *S* and *P*. (Santas 1979: 312)

Thus in contrast with Vlastos and Robinson, with their interpretation based more on intuitive induction, Santas thinks that the number of instances inferred from is of great importance. E.g. “it has the form of an argument by analogy, and in so far as it proceeds from only one instance it is weak.” (Santas 1979: 146) In spite of this, Santas thinks both the analogies that he discusses (*La.* 184d-185a and *Cri.* 47a-48a) are strong. Yet it is not obvious why Santas still think they are strong arguments given his interpretation. Let us deal with these two analogies in turn.

The argument in *La.* 184d-185a is preceded by two short speeches, one by the general Nicias and the other by the general Laches. The problem is whether fighting in armour is a subject that young men should be taught or not. Nicias argues that it should be, Laches argues that it should not. Lysimachus then proposes that the problem should be solved by Socrates ‘casting his vote’ on one of them. Lysimachus and Melesias, who are following the discussion between Nicias and Laches, will then accept the position that Socrates support, viz. they will follow the majority. Socrates then gives an argument that disproves this proposal by Lysimachus. Socrates first gives the following premise (which Melesias accepts), presenting a case of an expert:

Socrates: Suppose there should be a council to decide whether your son ought to practice a particular kind of gymnastic exercise, would you be persuaded by the greater number or by whoever has been educated and exercised under a good trainer?

Melesias: Probably by the latter, Socrates. (*La.* 185e)

After this Socrates makes the superordinate principle explicit. “So I think it is by knowledge that one ought to make decisions, if one is to make them well, and not by majority rule.” (*La.* 185e) Then the conclusion of the analogy is drawn, namely that one should follow the expert on the issue they are debating (armed combat), and not the majority. The dialogue then moves on to discussing if any of the present is an expert on the issue; and if no one of them are then who is an expert on it.

I find Santas’ analysis of this argument to be rather peculiar. He ignores the superordinate principle, and he also ignores that both the trainer and the expert on armed combat are experts. Instead he constructs a premise, based on the succeeding discussion in

185b-e and 189e-190e: “The consultation as to whether our sons should learn fighting in armour is consultation about means to ends.” (Santas 1979: 140) If our argument had followed the discussion of means and ends particularly in 189e-190e, I concede that it would be possible to make this procedure. But since Santas draws this premise from a succeeding discussion it is highly questionable. On this reading Socrates conclusion will at first be invalid, as it is missing a necessary premise. But there is no textual basis for saying that the conclusion in 185e should be taken to be unproven at this point. Especially since the argument can be interpreted as perfectly valid and sound without making use of Santas’ questionable premise. Let us look closer at the structure that Santas proposes for analogical arguments:

P1 a, b, c, each is known (observed) to have S and P

P2 d is an S

C1 Therefore, (Probably) d is P. (Santas 1979: 140)

Under this structure, *a, b, c*, (etc.) are the cases inferred from, and *d* is the case inferred to. *S* and *P* are attributes. Santas thinks this is the structure of all analogical arguments, while the words in the parentheses modify this structure to be an inductive analogy. I can only speculate, but it might be argued that this structure is the reason why Santas interprets this argument so peculiarly. With this structure an analogical argument must be an inference between two things having many similar attributes, but where one of them is known to also have an additional attribute. Understood this way an analogy is a kind of induction, but where the importance is not so much the number of cases cited as the number of similar attributes shared. Cf. “the similarities between the two cases are considerable, and this strengthens the argument [...]” (Santas 1979: 140-1) As there is no necessary connection between having the shared attributes and in addition having another attribute in common, this argument would at best be probable. If it is accidental that they share the same attributes, one cannot from that infer with necessity that they also will share other attributes. However, if it is known that having an attribute, or being a certain thing, necessarily entails having an additional attribute – then the analogy would be deductive. There would be a necessary connection between the two, thus validating the inference. The proposed structure of analogical arguments that I propose below is in many ways similar to the structure that Santas proposed, but with one

essential difference. If *S* is taken not to be an attribute, but rather the genus of *a* to *d*, and if being a part of *S* necessarily entails having *P*, one ends up with a valid deductive argument¹³.

Using this structure let us again look at the argument from *La.* 184d-185a. Now *a* is the gymnastic trainer, *d* is the expert on armed combat, *S* is being an expert, and *P* is that one should be persuaded by the expert and not the majority. The argument is then that 1) if one should be persuaded by the gymnastic trainer on issues within his expertise (because he is an expert), and 2) if there is an expert on armed combat, then 3) one should be persuaded by the expert on armed combat on issues of armed combat rather than by the majority. This is a perfectly straightforward interpretation, adding nothing to what is said in 184d-185a, and giving a deductively valid conclusion. This interpretation is further strengthened by the succeeding question that Socrates raises, namely who among us (if any) is the expert on armed combat. This would be the natural question to ask if the preceding argument had been the one I am suggesting.

Next let us look at Santas' discussion of *Cri.* 47a-48a. Preceding Socrates argument, Crito argues that if Socrates refuses to escape from prison, then the public opinion would be that he did not escape because of cowardice and unmanliness in himself and his companions. And this would be contrary to the good. Socrates then intends to disprove Crito's argument, by showing that the good is not to be concerned with the opinion of the majority. "Should a man professionally engaged in physical training pay attention to the praise and blame and opinion of any man, or to those of one man only, namely a doctor or trainer?" (*Cri.* 47a-b) Crito accepts that one should follow the doctor and trainer, and Socrates then makes Crito accept a few implications of this, most importantly that if one were to follow the opinion of the many in this respect, it would harm one's body. And further, that a life is not worth living if one's body is in a poor state. Then, that the part concerned with justice and injustice is even more important than the body, and if that part is in a poor state then one's life would certainly not be worth living. Socrates then concludes saying: "we should not then think so much of what the majority will say about us, but what he will say who understands justice and injustice [...]" (*Cri.* 48ab)

Again Santas adds too much of Plato's doctrine into his interpretation. Remembering his structure of an analogy presented above, he thinks he finds the following attribute P1(a) shared between on the one hand the doctor and trainer and on the other the expert on justice:

¹³ McPherran also thinks this argument is a deduction, but he still accepts most parts of Santas' interpretation. The only thing he changes from Santas' interpretation is that he exchanges the particular premise P1 with a universal premise. Thus, my criticism of Santas holds equally well against McPherran.

“it takes experience and knowledge to determine which actions promote virtue in the psyche and which destroy vice, i.e. which actions benefit the psyche and which harm it.” (Santas 1979: 146) To this he adds that one must presuppose the analogy between the health of the body and the health of the soul, e.g. from *Grg.* 464a-466a. But our argument does not even mention the soul, except implicitly when referring to the matters concerning justice and injustice. Nor does he say that it takes experience and knowledge to determine which actions promote virtue. What he does say is that if there is an expert on matters pertaining to justice and injustice, then we should follow him rather than the majority. Then in his conclusion, Santas does not add the second part of the argument, where he concludes that following the majority in matters of justice and injustice makes it not worth to be living.

I think it a much better interpretation to also read this argument as a deductive analogy. 1) In matters of physical training one should follow the expert on the subject, the doctor and trainer, and not that of the majority. 2) and if there is an expert on the just and unjust, 3) then in matters of the just and unjust one should follow the expert on the just and unjust, and not the majority. Then, from 47e to 48a a second argument is presented. 1) In matters of physical training if we follow the opinion of the majority rather than the expert (the doctor and trainer), it will ruin our body and make life unliveable. 2) The part concerned with justice and injustice is more valuable than the body. 3) Thus in matters of virtue and vice if we follow the opinion of the majority rather than the expert, it will ruin the part concerned with justice and injustice, and make life unliveable. In this manner Socrates disproves the argument of Crito.

Santas says that the argument “appears to be a very strong argument because the connection between (a) and (b) in P1 is not simply conjunction but a much stronger connection [...] If we grant P1(b) on the basis of P1(a), it appears that by parity of reasoning we should grant C1(b) on the basis of P2(a).” (Santas 1979: 146) This is the closest formulation of Santas explaining why the analogy is strong, but it is hardly satisfactory. As we saw, the premise that he reads into the text, P1(a), is not there and is not necessary for the argument. In contrast what actually ties the attribute (b), that one should follow the expert on the subject rather than the majority, together with the both the doctor and the expert on justice, is precisely that both are said to be experts. And a necessary attribute of being an expert is that people should follow him rather than a non-expert.

Santas also discuss the analogy in *Grg.* 460a-c, only he does not think it is an analogy. The argument begins with the following premise: “If you make someone an orator, it’s

necessary for him to know what's just and what's unjust [...]” (460a) Then it is argued that the man who has learned carpentry, or music, or medicine, or other expertise is a carpenter etc. And thus, he who has learned the just is a just man, and a just man does just things. So the conclusion is that an orator is necessarily just and will never do injustice.

The interpretation that Santas presents is threefold. First there is an inductive generalization from the carpenter, musician and doctor to the universal, viz. that every expert is named after the subject one has learned. The second part of the argument is deductive, using the universal just proved together with the premise that justice is an expertise, inferring that he who has learnt justice is a just man. And third, there is a *modus ponens*. If the orator (just man) is necessarily just and of necessity wishes to do just things, then the just man will never do injustice. It could be argued that the argument is better described as being an analogy followed by a *modus ponens*. It depends on whether one thinks Socrates in 460b, where he gives the universal, is making the universal implied in the cases explicit, or whether a one thinks as Santas that the three cases given is supposed to prove the universal. Now I agree with Santas that the three cases and the universal are not tautologies¹⁴. But at the same time it seems to be a necessary part of what it is to be an expert¹⁵. E.g. when graduating from medical school it follows necessarily that one can call oneself a doctor. That is something that is not obvious, e.g. a child does not have to comprehend that it is necessary to have graduated from medical school to be a doctor. At the same time, it is a premise that can be taken for granted in normal conversation. Now it is possible that Plato thought the three cases he cited proved the universal, and one could say as Robinson that Plato had a confused concept of induction. Yet as it is not necessary to interpret the passage in this way, and as I judge it to be a more benevolent reading if Plato merely stated the universal as a premise, I find my reading to be preferable.

The most recent commentator is McPherran, who seems to think that there are many different types of Socratic induction. However, he wants to emphasis one particular type that he thinks has previously been underestimated, namely probable induction. He defines probable induction as a “generalization employing a survey of coordinate cases involving intuition of the universal (but not yielding certainty, as in conception (A) of intuition of the universal).” (McPherran 2007: 363) He also gives an example of this type of probable induction: if one were to check the price of gasoline in Franklin County at “six scattered

¹⁴ Cf. Santas 1979: 152.

¹⁵ Cf. McPherran 2007: 356, which agrees that this argument “is not actually inductive”.

filling stations (including a discount station)” (McPherran 2007: 361), and if one found the price in all cases to be slightly higher than \$2 a gallon, then would could with a high grade of probability conclude that “gasoline prices are over \$2.00 a gallon in Franklin County.” (Ibid.) The probability of the conclusion is strengthened the more representative the selection of cases is, and the more one can refer to other statistical laws, e.g. if the prices between the various filling stations is known to usually vary within a few cents of each other. In contrast to Santas’ view, where the probability of an analogy depended on the number of shared attributes, McPherran thinks the probability depends mainly on how representative the selection of cases is. E.g. if one is doing a survey on consumer habits, but only interviews people from the same part of the city, of roughly the same age, of the same sex, and the same religion – the selection will not be representative for the whole city. In the same way, when giving cases of experts one should give one theoretical, one practical, one craft, etc. Thus the more representative selection one gives, and if one in addition can cite any statistical laws, this will give a highly probable argument. But while this method may have its uses in the field of statistics, it can hardly be said to be applicable as a philosophical method. However, one should not be too hasty before we have looked at the Socratic arguments that he cites in support of his theory.

There is also some variance between his article from 2007 and the one from 2011. While in the 2007-article the emphasis is on arguing against Vlastos (and in a lesser degree Robinson), in the 2011-article the emphasis is on contrasting his view to that of Santas. In the more recent article, the conclusion is given that “the preceding arguments [...] validate the 1979 insight of Santas that marked an important correction to the 1953 work of Robinson on *epagōgē*.” (McPherran 2011: 69) In the older article McPherran treats his interpretation as more separate from Santas’. But especially in the more recent article McPherran criticises some interpretations of Santas.

McPherran interprets *Cri.* 46b-48b quite differently from Santas¹⁶. He thinks that it is not an analogy but rather a complete enumeration. He bases this interpretation solely on the following lines:

So with other matters, not to enumerate them all, and certainly with actions just and unjust, shameful and beautiful, good and bad, about which we are now deliberating [...](47c8-11)

¹⁶ Cf. the discussion of Santas’ interpretation above.

In the lines that McPherran quotes, Socrates clarifies the superordinate principle, making it clear that also justice falls under the principle. But I fail to see in this line any enumeration of cases, either complete or incomplete. He simply says that it holds for all experts, but does not give any indication that he thereby has checked every possible type of expert. He states the universal characteristic of experts, but this is something very different from enumerating every instance of it. Just as to say that ‘all the balls in this basket is red’ is something quite different from taking all the balls out of the basket and checking that each of them are red. What he says is that one should follow the opinion of the expert as such (not just the trainer and doctor), and that this also applies to the just and unjust (the shameful and beautiful, the good and bad, are simply synonyms for the just and unjust here). So again I fail to see any enumeration of cases said to be representative, and nothing at all of it looks like the statistical-probabilistic type of argument presented above.

McPherran refers to a further 5 arguments which he thinks are typical instances of probabilistic induction. I can grant to him that *Chrm.* 159b-60d and 167c-68b are instances of probabilistic reasoning. I think *Euthphr.* 7a6-8a8 is simply guilty of a logical fallacy, viz. the fallacy of false dichotomy. I don’t think *La.* 192b9-93d8 and *Mem.* 1.2.9 are instances of probabilistic reasoning.

Chrm. 159b-60d presents a counter-argument to Charmides’ proposed definition of temperance as a sort of quietness. Socrates says that in writing, reading, playing the lyre, wrestling, boxing, running, pancration, running, jumping, and all the movements of the body, the admirable is to do these quickly and not slowly¹⁷. And since temperance is admirable, in matters of the body temperance will be quickness, not quietness. And in learning, teaching, recalling, remembering, shrewdness, understanding, operations of thought, making plans, the admirable is to do these quickly and not slowly. So both in matters of the soul and of the body, the admirable is to do these quickly and not slowly. Then he concludes, temperance is rather quickness than quietness, and Charmides’ proposed definition has been refuted. McPherran takes note of what is said in the conclusion, namely that “either no quiet actions in life appear to be more admirable than the swift and strong ones, or very few.” (*Chrm.* 160c) Now this appears to be a very different argument from the expert-analogies. All one is given is various cases, covering a reasonably wide area, with all of these having the attribute that it is more admirable to do them quickly than quietly. But there is no explanation why the quick,

¹⁷ The argument uses the equivocity of ἡσυχιός, which means both ‘quiet’ and ‘slow’.

per se, should be better than the quiet. And thus I am willing to accept McPherrans interpretation that this one argument is a probable induction.

Chrm. 167c-68b gives a counter-argument to a proposal from Charmides that temperance is a science both of other sciences and of itself (166c). But there is no vision of vision, no hearing of hearing, and none of the other senses sense itself and the other senses. Further there is no desire of desire, no wish for wish, no love of love itself, no fear of fear itself, and no opinion of itself. The implicit universal is that “none of the things that are is of a nature to have its faculty (*dunamis*) relative to itself (*pros heauto*).” (Dancy 2004: 102-3, cited in McPherran 2007: 363) So the conclusion is that there cannot be a science of itself and other sciences. Again, McPherran takes note of this sentence, which modifies the conclusion and indicates that the result is uncertain: “However, we ought not yet to state categorically that there is not, but still go on investigating whether there is.” (168a) I think it is quite clear that the premises does not validate a universal conclusion. There is nothing connecting these faculties with the sciences (ἐπιστήμη), and thus the implicit universal that would validate the conclusion, does not follow from the premises. I agree with McPherran that this argument is just a probable induction, and is a rather poor argument.

McPherran cites *Euthphr.* 7a6-8a8 as an example of a probabilistic inductive argument, yet he does not give a discussion of it. The argument begins with the premise that the gods are in discord, and are angry at each other. Now if one were to differ about numbers one would count them and resolve the difference. And the same about the larger and smaller, one would measure them and resolve the difference. And the same about the heavier and lighter, one would weigh them and resolve the difference. But on the just and unjust, the beautiful and ugly, the good and bad, if one differs on these one becomes angry at each other. The conclusion is then that the gods differ on what is the just and unjust, the beautiful and ugly, the good and bad. The weak spot in the argument is that Socrates has not proven that there are no other subjects than these that are such that if one differs on them one becomes angry with each other. In other words, the cases he cites does not seem to be exclusive, and thus the argument is guilty of the fallacy of false dichotomy. Now this is my interpretation of the argument. I am not sure how McPherran supposes to interpret this argument as a probabilistic argument. Arguably it is a poor argument, but it is not poor because the cases Socrates cites are not numerous and representative enough. He could cite many more cases from widely different fields, all showing that when people differ one does not become angry at each other, but the argument would still be guilty of the logical fallacy. Only if the

dichotomy is proved to be correct can one argue that because it is not the first alternative, then it necessarily has to be the second.

La. 192b9-93d8 is another example that McPherran cites yet does not discuss. Laches propose that courage “is a sort of endurance of the soul” (192c), and Socrates intends to show that this definition will not do. Now endurance accompanied by wisdom is a fine thing, but if accompanied by folly is harmful. Since courage is fine, the definition is restated as wise endurance of the soul. Now I don’t think it is this part of the argument that McPherran has in mind, as this seems to be a straightforward deductive argument. And here the dichotomy is valid, as wisdom is the contrary of folly. Then Socrates moves on to inquiring what kind of wise endurance the courageous man possesses. Now it is not that of the money-maker who endures spending his money knowing that he thus in the end will make more. It is not that of the doctor who endures refusing the patient from eating and drinking, knowing that this will benefit the patient’s health. And then he compares the soldier who knows his side has the advantage and therefore endures with the soldier on the opposite side of the battle who endures without this knowledge – and Laches thinks the second man without knowledge is the more courageous. And the same with the cavalry rider who knows horsemanship and the one who does not, Laches thinks the one who does not know it the more courageous. And the same with him who knows slinging or archery compared to the one who does not. And in general the one without knowledge is braver. Now those run greater risks and endure more foolishly than those who have knowledge, and thus courage has been found to be foolish endurance, not wise endurance. Again I fail to see the supposed probable induction. The adding of the case of the cavalry rider etc. does not seem to be there in order to increase the probability. Rather the cases cited lead Laches further and further towards the absurd, as they exhibit a greater and greater degree of folly. McPherran might be taking the cases to be proving the universal, viz. that the one without knowledge is always braver, but it rather seems to point out something about how Laches comprehends the concept of courage. In either way it does not seem to be a very good argument, as it does not prove anything about courage per se. All the argument proves is that Laches’ conception of courage is at odds with the definition that he proposed.

Mem. 1.2.9 is the last example that McPherran gives of a probabilistic induction, but the example looks like the standard expert-analogy:

But, said his accuser, he taught his companions to despise the established laws by insisting on the folly of appointing public officials by lot, when none would choose a

pilot or builder or flautist by lot, nor any other craftsman for work in which mistakes are far less disastrous than mistakes in statecraft.

His reason for thinking this is a probabilistic argument is that “one can imagine a counter-example to its claim, namely, the existence of a craft whose expertise is sufficiently difficult to test for (say, the craft of divination) that it is better to leave the choice of its best practitioner to the lot...” (McPherran 2007: 363) But the text nowhere mentions any test being done. The superordinate principle is instead that one ought to choose the one with expert knowledge, instead of choosing it by lot. The conclusion then follows from the premises if the reason why pilots etc. should not be chosen by lot is because they are experts, and if there is such a thing as an expert statesman. Exactly how one is to recognize this expert is not mentioned, and this is not required for the conclusion. I think this argument is a typical analogy that is used frequently by Xenophon, Plato and Aristotle. Its foundation is the conception of an expert, rather than the number of cases cited and how representative these are for the group. Thus it is an expert-analogy, and not as McPherran suggests a probable induction.

As I said above, I can accept McPherran’s claim that Plato have a few probabilistic arguments. What I cannot accept is his claim that most epagogic arguments are probabilistic: “This means, of course, that—contrary to Robinson’s account of *epagōgē* as (A) intuiting the universal where this yields *certainty*—Socrates saw such intuitions of a universal as standing in need of corroboration through a sampling of cases and as only providing probable results.” (McPherran 2007: 362) The examples that McPherran discusses does not in any way warrant such a broad conclusion. At best one can say that there are a few weak arguments to be found, where the conclusion can only be said to hold by a probability. But these passages should be seen as exceptions, and that Socrates usually gave better arguments. What one should not do, though McPherran seems to be doing it, is to reinterpret the form and validity of all Socrates’ arguments, based on picking out the weakest arguments and then inferring that the other arguments are just as weak. It is of course not impossible that McPherran’s interpretation is correct; however it has weak textual support and is an uncommonly malevolent reading.

My discussion will focus on the analogical epagogic arguments, viz. the expert analogies, rather than the arguments of Robinson’s type 1 where one does not infer to a particular. For one, the analogies are quite dominant. Secondly, they usually present the more interesting arguments; viz. arguments that play a more central role in the dialogues. As Santas puts it, “it is these applications that make his remarks about the science-crafts philosophically

interesting.” (Santas 1979: 147) As will be seen, my interpretation is neither as the statistical induction that only yields a probable inference pace McPherran and the more moderate Santas, nor the interpretation as an intuitive induction where it is not an inference at all pace Vlastos and the more moderate Robinson. I agree with the one side that it is an inference, and I agree with the other side that the premises are a result from concept-analysis rather than collection of data. Before I present my interpretation of the structure of the expert-analogies, I would like to look at a different type of argument which I will argue is of the same logical form as the Socratic analogies. To make a pun, I would like to explain analogy with an analogy.

III Biological homology

In comparative biology there is a method of inference called homology. Somewhat confusingly, this term is used both for the inference from one species (or a part of a species) to another as well as the equivalent attributes that is inferred. As the second usage, it can be defined as “equivalence or sameness of organismic parts due to common ancestry.” (Sluys 1996: 145) This is separated from analogy, where the sameness is not due to common ancestry. The most interesting form of it is the *supraspecific*, which is a “correspondence between characters of different species or higher taxa.” (Sluys 1996: 146) Richard Owen¹⁸ defines homology as “the same organ in different animals under every variety of form and function.” (Owen 1843: 379)

Here is an example of an homology in the second sense, from Darwin’s *On the Origin of Species*:

What can be more curious than that the hand of a man, formed for grasping, that of a mole for digging, the leg of a horse, the paddle of the porpoise, and the wing of the bat, should all be constructed on the same pattern, and should include the same bones, in the same relative positions? Geoffroy St. Hilaire has insisted strongly on the high importance of relative connexion in homologous organs: the parts may change to almost any extent in form and size, and yet they always remain connected together in the same order. (Darwin 1859/2005: 572)

¹⁸ Richard Owen was also a great admirer of Aristotle, cf. Lennox 2010: 351.

Without the premise that there's a superordinate principle, common ancestry through evolution, these facts are curious. And it would certainly be impossible to infer from the bone structure of one species of animal to that of another, unless one assumes this principle, such that they in one sense are equivalent. The bone structures are identical as to order and number, because they are fundamentally the same bone structure tracing back to a common ancestor.

If one assumes the principle of common ancestry between two species, one can infer from the bone structure of a species that one has studied, to a species that one has not studied. Thus one could make a valid inference from the leg of the horse, for instance how bone X connects with bone Y, to a conclusion that also in the leg of the cow bone X connects with bone Y. This analogy is supported by the two species being connected through common ancestry, and by the fact that the order and number of the bone structures within this taxonomic rank. Now a day it is however broad agreement that homology has limited use, and long gone are the days when one could reconstruct a whole animal from the smallest remnant of a bone.

The concept of homology was created in the beginning of the 19th century, however “Russell claims to find the idea of homology and even, implicitly, the distinction between homology and analogy in the *Historia Animalium* and *De Partibus Animalium* of Aristotle.” (Panchen 1992: 63) Russell refers to *PA* I 4, 644a16-23, and says it “show that Aristotle had some conception of homology as distinct from analogy. He did not, however, develop the idea.” (Russell 1916: 9) Further below he says that “Aristotle took much more interest in analogies, in organs of similar function, than in homologies. He did recognise the existence of homologies, but rather *malgré lui*, because the facts forced it upon him.” (Russell 1916: 10) Balme also finds a concept of homology in Aristotle: “the concepts of ἀναλογία and ὑπεροχή proved useful to Aristotle, and led to the modern concept of homology,” (Balme 1962: 89) And in another article Balme refers to the same passage as Russell: “so in *PA* I 4 Aristotle explains that between genera the comparison is analogical (feathers: scales: hair), while between species it is a comparison of degree or ‘the more or less’ (roughly what we call homology).” (Balme 1975: 185) This stands somewhat in contrast to Lloyd, who says that “Aristotle has, to be sure, no equivalent to the technical distinction between homology and analogy, between parts that are morphologically and genetically similar, and those that merely serve a similar function.” (Lloyd 1996: 152) However, while discussing Aristotle's and Theophrastus' comments on *Emp. fr. 68*, which argues that milk is putrefied blood, he says that “the fragment may be said to contain the first attempt to use something resembling the

modern principle of homology to relate the parts of different species of living beings.” (Lloyd 1966: 336) Balme argues that Aristotle had a concept of homology based on morphologically similar parts: “Aristotle based his homologies on common function, not on any theory of common descent, still less on evolution from a common ancestor [...] He recognizes them chiefly by morphology [...]” (Balme 1992: 120) I think there are strong indications that Aristotle had some form of method of homology, but that this method did not have the strong separation from analogy that it has today. And most certainly he did not have the explanation of this homology, that of common ancestry. But my thesis does not depend on Aristotle having a modern conception of homology. What it does depend on is his division of identity into three parts as made in *PA* 645b 26ff. and *HA* I. 486a14-487a10, viz. that of specific, generic and analogical. I will use this division later on while discussing the theoretical basis for the expert-analogies. Balme identifies the generic identity with homology¹⁹, while the analogical identity corresponds to the biological concept of analogy viz. where there is no genus to which the two species or parts belong.

¹⁹ Cf. Balme 1992: 120.

IV An interpretation of Socratic analogies

At present I will argue that the Socratic analogies work much the same way as the biological homologies. It is an inference from one or more experts to another expert. The superordinate principle that validates the inference is that they are experts, together with the proposition that certain attributes are necessarily possessed by any expert. Thus, they will have the following form, where the second premise is usually left implicit.

P1) *Technē* X has the attribute a.

P2) Every *technē* has the attribute a.

P3) Y is a *technē*.

C) Y has the attribute a.

Or possibly it would be better to present it like this, only having two premisses. Again, the second premise is usually left implicit:

P1) T1 has A because it is an expertise

P2) T2 is an expertise

C) T2 has A

Vlastos is correct in his view that the conclusion is built into the critical term, and this critical term is that of the expert. He is wrong when he thinks the Socratic analogies are intuitive inductions, i.e. that they only exemplify and do not prove. In the valid, though not sound, argument that I cited above from *Men.* 90c-91b, the conclusion is inferred, and what is more, it is not something evident given an understanding of the expert. Even though the conclusion is built into the term, it is not a mere restatement of the definition. A definition of the expert could be a person having special knowledge/skill of a topic, and from this definition and other propositions one could perhaps arrive at these various attributes of the expert. But even then, they would have to be derived – precisely how Plato would derive them is a bit uncertain, as these presuppositions about the expert are put forth by Socrates and accepted by his interlocutors. But I do not think they are ever proved by him by empirical support, nor that they “might be *falsified by experience*” (Vlastos 1991: 268), because I argue that they are inferences. It does not necessarily follow that any inference can be falsified by experience.

The particular experts that is inferred from and inferred to are different types of expertise. They can be seen as taxonomic ranks, the particular cases as the shoemaker and the captain is on the rank beneath that of an expert. Thus the captain etc. is the species, expert the

genus. This division into ranks could also sound like Plato's method of division (διαίρεσις) in e.g. *Sophist* and *Statesman*, however this type of analogy is a fundamentally different method from that of division. This is exemplified below in the discussion of *Grg.* 464a-465e.

Because of this taxonomic relation the Socratic analogies are quite strong, since the analogies are not based on mere similarity. The superordinate principle makes them, qua experts, equivalent. One is talking about the same thing, only that the expertise which one infers from is clearer, better known, easier available, etc. to us than the one being inferred to.

The structure of this type of analogy is not limited to the expert-analogy. The same form of argument is I think applicable in many circumstances, provided one generalizes the structure. Exchanging the variable G, for genus, for the mention of expertise above, one arrives at a structure like this:

P1) G1 has C in virtue of belonging to G

P2) G2 belongs to G

C) G2 has C

It is clear that the genus works as a middle term does in a syllogism, thus connecting the term B with the attribute C. Further the terms are predicated univocally as required for a valid syllogism, thus avoiding falling into a metaphor and a fallacious inference. It is however far from being a syllogism, as it makes use of 4 terms instead of the 3 that a syllogism uses. Still, it is a form of deductive argument.

Thus one could use this structure to formalize e.g. a homological argument. The premises would however be vastly different. In an expert-analogy the premises are the result of concept-analysis. They are general, and attribute something to a species. The truth of the premises depends solely on having the right conception of the concept. In biology one performs empirical research, using scientific instruments one observes certain features, and these are then gathered under a concept. However, how the premisses are attained is irrelevant for the structure and validity of the inference, provided that the premises are true and that the proposed structure of analogical inferences which I have suggested above is in fact a valid form.

V The theoretical basis for the expert-analogies

Thus far we have confined our discussion to the application of the expert-analogies in Plato's dialogues, and to the main interpreters of this practical use of the method. In the previous chapter I presented my alternative interpretation, and illustrated it by comparing it to the method of homology. In the present chapter I will deal with the theoretical discussions of this kind of method found in Plato and Aristotle. This will elucidate my interpretation of the expert-analogies, and situate it among the other methods of inference. And most importantly, it will give us a justification of the analogies, i.e. it will give a reason why this form of analogy is valid (though not necessarily sound).

V. 1 Plato's discussion of analogies

I do not think it possible to present Plato's discussion of analogies much better than Robinson does in chapter 12 of his *Plato's Earlier Dialectic*. And even his discussion is remarkably short, and to a certain degree speculative.

In contrast to the selfconscious discussions of hypothetical method, which is not much used in the dialogue, analogy and imagery, which are frequent, receive very little discussion. Moreover—a further accenting of the incoherence—what is said about them is mostly against them. (Robinson 1953: 202)

This is a fair summary of the position. Still, I think it of value to rephrase and repeat the observations that Robinson makes. A rather speculative attempt at connecting Plato's use of analogies with his epistemology is suggested by him. It is remarked by Robinson that Plato's usage of the word analogy (ἀναλογία), as well as the adjectival form and phrases related to the word, only refers to mathematical proportion. He emphasises the Pythagorean aspects of Plato, namely the belief that geometrical analogies, viz. proportions (ἀναλογία), are frequent and should be searched for in reality. The most relevant dialogue for this reading is the *Timaeus*, and Robinson refers to 31C: “the finest bonds is that which makes itself and the things it binds as much *one* as possible, and this is most finely achieved by proportion.” And also *Phlb.* 16D: “We ought always to assume and search for *one* form concerning everything on each occasion, for we shall find it there.”²⁰ Now there is the problem with using the

²⁰ Both translations are from Robinson 1953: 209-210.

Timaeus as a justification for the use of analogies, as the dialogue itself is centred on the imagery (I think it more fitting to call it so than an analogy) of the divine craftsman. And there is the added difficulty that Plato's use of ἀναλογία cannot be translated with analogy, as noted above. However, Robinson comments on this:

We may note in passing, however, that it means something closely related, and something that indicates a rule of method. For Plato believes that 'analogies' or 'geometrical equalities' are frequent in reality and basic to its structure, and this Pythagorean conviction indicates one simple but important rule of method: 'look for proportions in reality, for they are there and you will find them.' (Robinson 1953: 209)

But this speculative suggestion does not to any significant degree enlighten our understanding of what makes an analogy valid. We are still left with the question why Plato would rely so heavily on analogies. Robinson suggests that there are "certain passages that offer something approaching discussions of analogy." (Robinson 1953: 210) These passages are *R.* II 368 and *R.* IV 434D-435A. The first of these makes an analogy between small and big letters, and justice in one man and in the city. Just as it is easier to read big letters than small letters, it is also easier to find justice in the city than it is in one man. The methodical conclusion is that one should begin with the bigger, viz. more easily available, object, and then one should compare the bigger with the smaller, to see whether they are the same. The second passage says that if one first studies justice in the city, it will be easier to detect justice in the individual. One infers from what the justice is in the city, to what justice is in the individual. Then one checks to see that it is the same justice in the individual, and if it is not one needs to compare the two further.

Robinson finds several problems in this discussion of analogy. The first is that the two passages present analogy as a method of discovery, not as a method of justification. There is often a thin line between discovery and justification²¹, but these two passages certainly does not give much in term of justifying analogy, with the exception that one can find the principle that one should infer from what is better known to what is less known – but this principle is the basis of all valid inference, not just that of analogy. This is what Robinson says:

The passage regards analogy as a method of discovery and not also as a method of proof or argument. It therefore provides no justification of Plato's use of analogies, including this very one between city and man, as a means of argument and persuasion.

²¹ E.g. Peirce's concept of abduction is sometimes formulated as a method of discovery, at other times as a method of justification. Cf. Plutynski 2011.

This, however, is not to say that such a justification is impossible. (Robinson 1953: 211)

The second problem is that Plato only has a hypothetical city in mind, not an actual one. Sc., “what he will get out of his analogy, therefore, seems to be whatever he himself put in.” (Robinson 1953: 212) A modern reader would demand a critical discussion of which cases (actual and hypothetical etc.) one can draw an analogy from, but Plato does not offer such a discussion in the passages. Not that Plato is uncritical to any analogical argument. Robinson refers to *Phd.* 99E, *Men.* 73A, *R.* I 337C, *Chrm.* 165E & 166B, *Cra.* 429B, *Euthd.* 298C, *Men.* 80C and *R.* III 408D, all passages critical to a proposed analogy²². Plato must have some criteria of a good analogy in mind, but this criterion is as mentioned not to be found in the two passages from the *Republic*.

Robinson also comments on *Plt.* 277-9, where example (παράδειγμα) is discussed. The context is children learning the letters, and having problem recognizing a letter in a long word, but not in a short one. By putting them next to each other, the child comes to recognise that they are the same letter.²³ But also here there is a problem.

[...] what it primarily justifies is the use of examples in teaching, not in suggesting new propositions to oneself or in proving such propositions. It is stated in terms of the man seeking to enlighten another, not of the man seeking to enlighten himself. To what extent can it justify the use of analogy in invention and proof as well as in teaching? (Robinson 1953: 213)

However, Robinson thinks this problem of the possibility of teaching oneself can be successfully answered. The use of example can allow us to see the similarity between the example and another proposition, and to infer from the one to the other.

In example, to modernize the image in the *Republic*, the juxtaposition of the two propositions causes the spark of knowledge to leap across from the old to the new, not because the old entails the new, but because of ‘the same likeness and nature’ dwelling in both of them, that is, in our language, because they are coordinate cases of the same universal, although that universal is not explicitly mentioned [...] Now, such being the nature of example, we can, so to speak, teach ourselves with it as well as others. (Robinson 1953: 213)

²² Cf. Robinson 1953: 215-216.

²³ Cf. McPherran 2007: 358-9. He takes this to be a discussion of probabilistic induction rather than of analogy, based on the use of *epagein* and *anagein* in 278a. But this is a rather poor argument.

Take special notice of the formulation that Robinson uses. He says this is “because they are coordinate cases of the same universal”, or in the formulation that I have been using, that they belong under the same genus. However, this is but a possible explanation proposed by Robinson, merely indicating that Plato might have had this in mind. There is no univocal passage in the dialogues saying this, and as such it is but a minor point in favour of my interpretation of the analogies. But it is still a point that should be taken into consideration.

One should also note that Plato had a certain conception of genus and species²⁴. “[...] to be able to cut up each kind according to its species along its natural joints, and to try not to splinter any part, as a bad butcher might do.” (*Phdr.* 265e). Viz. he has a conception of genus, and further that this genus should be split into certain natural parts, the species. A species is thus not any arbitrary division, but a natural one. This could be connected with his concept of division (διαίρεσις), for instance *Plt.* 262d-263b where he compares splitting a genus into parts (e.g. the number ten thousand from all the rest) and splitting it into a real class (e.g. even and odd). And there are good indications that Aristotle took the concepts of genus and species from Plato, though developing them considerably. Cf. Ross, describing Plato’s method in the *Sophist* and *Statesman*:

[...] of tracing the relations of assertability and deniability that exist between Ideas, and the relations of genus and species that exist between them. It is typical of Aristotle’s good sense that, while he completely rejected the ideal of deducing all truth from a single truth, he accepted from Plato the notions of genus, species, and differentia, and by adding to them the natural corollaries, property and accident, established his doctrine of predicables. (Ross 1951: 119)

Robinson moves on to a related problem, as there seems to be a problem in how one can come to choose the right example, as in contrast to the teacher the self-learner does not beforehand have full knowledge of the issue. Robinson refers to the paradox in the *Meno*, and the solution that in some sense we already know and thus that the act of inquiry is but an act of recollection, as well as to *Plt.* 277d3: “It looks as if each of us knows everything in a kind of dreamlike way, and then again is ignorant of everything when as it were awake.”

The two together release us from the puzzle; when we search we can direct ourselves and know when we have succeeded because we already know everything; yet we need to search because, while we already know all things in one sense, in other senses we do not know them yet. (Robinson 1953: 214)

²⁴ Cf. Ross 1951: 174-5.

This quite Aristotelian²⁵ answer to the paradox in the *Meno*, i.e. we can acquire new knowledge because we already know it in one way but not in another, is Robinson's explanation of how one can acquire new knowledge through the use of analogies. He notes that this does not require that we know everything pace the *Meno*:

Our preexistent knowledge of X, although vague, is enough to guide us reasonably well in the choice of examples; then the example guides us back to a more precise knowledge of the X that is both the beginning and the end of our search. (Robinson 1953: 214-215)

On the other side, Robinson cites many passages where Plato criticizes the use of analogies. These passages can be grouped in two. The first as those that criticize a proposed analogy on the basis that they are not actually of the same genus, i.e. it criticized the soundness of the proposed analogy, cf. *R.* III 408d: “you have taken up an unlike thing with the same logos” (Robinson's translation). The second as those criticizing any argument based on similarity, i.e. the validity of such an argument, usually under the terms likeness (ὁμοιότητες) and like or probable (εἰκώς). Cf. *Sph.* 231a: “A safe man will always be on his guard most of all about likenesses” (Robinson's translation). *Phd.* 92d: “I know that arguments of which the proof is based on probability (τῶν εἰκότων) are pretentious...” The first type of criticism does not attack the validity of analogies, and with a conditional analogy it actually allows us to acquire new knowledge, though in the negative sense that the two particulars are shown not to belong under the same genus (*reductio ad absurdum*). With the second it is difficult to see if this applies to the kind of analogy based on both belonging to the same genus. It rather seems to apply to analogies where there is no shared genus, but rather just sharing some attributes – as well as applying to arguments using probability, and in this respect it certainly does not apply to analogies based on a shared genus. Robinson puts more weight on these passages than I do, perhaps because he did not have a clear enough conception of the type of analogy that I am defending, and concludes as follows:

They are only scattered hints, in which the idea is a chrysalis rather than a butterfly; and hence it is not surprising that they seem contradictory or at least incoherent. The proposal to look first at the large letters in the *Republic*, and the discussion of ‘example’ in the *Statesman*, supported in a vague way by the ambiguous *Phaedrus*, suggest that analogical argument is a valuable instrument; but the opposite is suggested by a majority of the passages in which the notion of analogy more definitely

²⁵ Cf. *APo.* A 1.

appears, under the form of τὸ ὅμοιον or τὸ εἰκός. There is no harmonization of these conflicting judgements, such as an attempt to state when analogy is good and when it is bad; and the prevailing opinion, which runs against analogy, seems to condemn Plato's own predilection for analogies in his dialogues. (Robinson 1953: 217)

What at least is clear is that Plato makes frequent use of analogies, especially the expert-analogy, throughout his entire corpus. Robinson's work only concerns the early and middle dialogues, but Lloyd has shown that this also applies for the later dialogues.²⁶ Commenting on Robinson's claim that the middle dialogues really depend on the use of analogy and imagery, he says that "indeed this is true not merely of the dialogues of the middle period, but of the whole Platonic Corpus." (Lloyd 1966: 389) I think however that I am in more agreement with Lloyd's conclusion, as he also explains away the apparent criticisms of analogies, and his view that one must go to Aristotle to find an in-depth justification of analogy.

Plato certainly made several important contributions to the understanding of the logic of argument from analogy. Yet while we find many scattered remarks in the dialogues that bear on the use of imagery and likenesses and reflect judgements concerning the cogency of specific analogical arguments, it is evident that he did not carry out a formal analysis of argument from analogy as such. For the first such analysis we must, then, turn to Aristotle. (Lloyd 1966: 403)

V.2 Aristotle's discussion of analogies

In contrast to our discussion of Plato above, which was pretty straightforward, our discussion of Aristotle will be elaborate and complicated. Previous commentators are numerous, and it concerns many aspects of Aristotle's philosophy. The first question is in which order the various conceptions and discussions relevant for Aristotle's justification of analogies should be presented. The ordering will to a large extent be arbitrary, but I think it most beneficial to discuss the passages where Aristotle discusses the difference between the specific, generic and analogical, which I also briefly mentioned above in my discussion of homology, at the end. I.e. to first clear away all the misconceptions, viz. red herrings, and at the end look at what I think is the solution. We can start by looking into the concept of analogy.

²⁶ Cf. Lloyd 1966: 389-403.

V. 2. 1 Aristotle's concept of analogy (ἀναλογία)

Aristotle inherits the concept of analogy (ἀναλογία) from Plato, where it is a proportional analogy taken from mathematics, and proportion is thus the etymological meaning of the word. An example of geometrical proportion would be that $\frac{5}{10}$ and $\frac{25}{50}$ are proportional in virtue of both exhibiting the relation $\frac{1}{2}$. An example of arithmetical proportion would be that $12 - 7 = 9 - 4$, in virtue of both being equal to 5. So that the form of a proportional analogy is that A is to B as C is to D, viz. that the relation between A and B is the same as the relation between C and D – $a R b = c R d$. The difference between its use in mathematics and in philosophy is that the terms in philosophy are not quantitative, and thus does not admit calculation²⁷.

There are those who think that Aristotle's concept of analogy is nothing more than this proportional analogy, most noteworthy Joseph Owens²⁸. But some of the passages in Aristotle are difficult, if not impossible, to reconcile with an interpretation of it as a proportional analogy. In addition a considerable amount of literature has been written on the theological aspects of analogy, based on the reading of Aristotle made by Thomas Aquinas. But I do not find this aspect relevant to our present query, and will not comment on it²⁹. Let us look at the passages in Aristotle.

It is true as Owens says (Owens 1963: 123) that Aristotle describes analogy as proportional in *Po.* 1457b16-18: "That from analogy is possible whenever there are four terms so related that the second is the first, as the fourth to the third; for one may then put the fourth in place of the second, and the second in place of the fourth." This is however in the context of metaphor and not a theoretical discussion of analogy – I will discuss how metaphor relates to analogy below. Another description of analogy as proportional is *Metaph.* Θ 1048b6-8: "But all things are not said in the *same sense* to exist actually, but only by analogy—as A is in B or to B, C is in D or to D; for some are as movement to potentiality, and the others as substance to some sort of matter." An expert-analogy is described as a proportional analogy, saying that "inasmuch as the relation of the builder towards the production of a house is like that of the doctor towards the production of health, and it is not a property of a doctor to

²⁷ Cf. Robinson 1952:466.

²⁸ Cf. Owens 1963: 123-125. Also cf. Hesse 1959-1960: 87, and Hesse 1966. Also cf. Anderson 1952. Owen 1960: 180 is a bit more ambiguous, saying that "the idea of proportion is central to analogy (*Met.* 1016b 34-35), even when the terms are not fully stated because they are obvious..."

²⁹ For those interested, vide especially *Summa Theologica* Q. 13, McInerney 1996 and Rocca 2004.

produce health, it will not be a property of a builder to produce a house.” (*Top.* 1036b35-137a1) But it is not clear why the relation should be the same. There is also a description of proportional analogy in *Metaph.* N 1093b18-20: “[...] one by analogy. For in each category of being an analogous term is found—as the straight line is in length, so is the plane in surface, perhaps the odd in number, and the white in colour.” This last is in the context of discussing the Pythagorean and to a certain extent Platonic view (see the discussion of Robinson in the previous section) that there are hidden mathematical proportions in reality, and it is difficult to infer anything about Aristotle’s conception of analogy from this passage. Cf. Julia Annas’s comments to this passage:

An interesting (because unparalleled) attempt by Aristotle to salvage something from what his opponents say. He admits that there are interesting mathematical structures reflected in nature, and that the Academy do point out formal analogies between generically different fields. But he firmly denies that this is anything more than coincidence; in particular, the numbers do not determine the natural facts. Aristotle does not give any background to these supposed analogies here, and they seem very dubious. Although Aristotle sounds less unsympathetic to them than one might expect, he cannot afford to allow that they are significant, for this would surely undermine the autonomy of different fields of inquiry, something which Aristotle is strongly committed to. (Annas 1976: 219)

The pure mathematical meaning is discussed in *EN* V 1131a29-b24, where it is argued that justice is a species of analogy. The definition given is of an entirely mathematical nature. Note that Aristotle allows there to be only 3 terms, if one of the terms are used twice. Note also that he says this is a geometrical proportion, not an arithmetical one (see above for this distinction).

For proportion is equality of ratios, and involves four terms at least (that discrete proportion involves four terms is plain, but so does continuous proportion, for it uses one term as two and mentions it twice; e.g. as the line A is to the line B, so is the line B to the line C; the line B, then, has been mentioned twice, so that if the line B be assumed twice, the proportional terms will be four); [...] As the term A, then, is to B, so will C be to D, and therefore, *alternando*, as A is to C, B will be to D. Therefore also the whole is in the same ratio to the whole; [...] (Mathematicians call this kind of proportion geometrical; for it is in geometrical proportion that it follows that the whole is to the whole as either part is to the corresponding part.) (*EN* V 1131a31-b14)

In *APo.* 77b39-78a4, Aristotle criticizes an analogy, where Fire is generated quickly and equally this analogy is generated quickly. Now this is not a proportional analogy, and Aristotle says that here there is no deduction. But he rephrases it into a proportional analogy, and says that in this case there is deduction: “if multiple analogy follows fastest analogy and the fastest changing analogy follows fire.” So that A, multiple analogy is to B, fastest analogy, just as B, fastest analogy, is to C, fire. Here we have a proportional analogy with three terms, where B is used twice. It would be reasonable to interpret this passage as coming out in favour of proportional analogy, and against a looser analogy based on two terms. But at the same time, it shows that Aristotle has an understanding of analogy that is broader than just proportional analogy, even though he in this passage privileges proportional analogy.

In *NE* II 1106a32-1106b3 he explains that one cannot use arithmetical proportion to arrive at the intermediate for humans – referring to the proper diet for Milo and for a beginner, and that it has to be the intermediate relatively to the man. Thus he has the concept of arithmetical proportion, but thinks it at the very least not applicable to ethics.

A very different conception of analogy is used in *APo.* 76a38-40: “Of the things they use in the demonstrative sciences some are proper to each science and others common—but common by analogy, since things are *useful* in so far as they bear on the genus under the science.” Aristotle is here saying that there are principles common to all the sciences, but that these are common by analogy because the principle has to be applied to each science – so that in geometry it has to be applied to lines, in arithmetic to numbers³⁰. Sc. this passage cannot possibly be interpreted as a proportional analogy³¹, and thus it most definitely is a distinct usage of analogy from that of proportional analogy. It is rather the sharing of some nature or attribute at a looser or more general sense than that holding between species under a common genus³².

Other passages using this meaning of analogy are *APo.* 99a15-16, where it is said that when things are the same by analogy in the major term, they are also the same in middle term, so that the cause of them are also the same³³. Also *Metaph.* Λ 1070a32: “The causes and the

³⁰ Cf. Ross 1949: 539.

³¹ Though Pellegrin 1987: 322 proposes that it can be interpreted as a proportional analogy of this form: “that which is *a* in *genos A* is *b* in *genos B*.” One then have 4 terms, but the addition of the 2 additional terms (*A* and *B*) does not seem to add anything to the analogy, and are thus superfluous.

³² Owen 1960: 171 paraphrases Theophrastus: “T. is careful to correct his overemphasis on the fragmentation of knowledge (8 b 24-27): it is also the task of science to aim at generality, and this may produce a subject-matter which is identical not in kind but simply by analogy.”

³³ Cf. Ross 1949: 670; though note that Ross erroneously thinks the analogical feature is one of same function or relation. For more on this see below.

principles of different things are in a sense different, but in a sense, if one speaks universally and analogically, they are the same for all.” I.e. viewed as high enough universal, they are analogically one. See also a few lines down, 1070b18: “all things have not the same elements, but analogically they have”. And at 1071a4-6: “And in yet another way, analogically identical things are principles, i.e., actuality and potency; but these also are not only different for different things but also apply in different senses to them. Again at 1071a25-27: “the causes of things that are not in the same class, e.g. of colours, sounds, substances, and quantities, are different except in an analogical sense”.

Metaph. Δ 1016b31-1017a2 says that “some things are one in number, others in species, others in genus, and others by analogy”. (I will discuss this passage in more detail when dealing with the discussion of the different senses of identity below.) The same view is expressed in *Metaph.* Δ 1018a12-14, though here discussing being different rather than being one. The same division is found in *HA* 1.1:

There are some animals whose parts are neither identical in form nor differing in the way of excess or defect; but they are the same only in the way of analogy, as, for instance, bone is only analogous to fish-bone, nail to hoof, hand to claw, and scale to feather; for what the feather is in a bird, the scale is in a fish. (*HA* 486b18-21)

Here one might understand the last sentence as a proportional analogy, but it is also evident that this passage understands analogy as something more than just proportional analogy. The same can be said of *Top.* 208a7-17. A similar passage is found in *PA* 644a16-23, the context being that Aristotle wants to explain why water animals and winged animals are not gathered together under a common genus:

Groups that only differ in degree, and in the more or less of an identical element that they possess, are aggregated under a single class; groups whose attributes are only analogous are separated. For instance, bird differs from bird by gradation, or by excess and defect—some birds have long feathers, others short ones. Bird and Fish (sic) only agree in having analogous organs; for what in the bird is feather, in the fish is scale. It is not easy to do this in all cases; for in most animals what is common is so by analogy.

In *APo.* 98a20-23, a slight variation of the above usage is found. Here it is said that it can be used for inference. After discussing cases falling under a known genus, he says that the single nature of pounce, spine, and bone lacks a name, but that there still is a single nature of them all. We will be looking closer at this chapter as well below.

From this it is clear, contrary to the opinion of Owens, that Aristotle developed the concept of analogy. Often it only denotes a proportional analogy, but there is also a different conception – which might be combined with a proportional analogy – signifying similarities between things of different genera.

As Owens erroneously explains the difference between the equivocal as directed towards something one ($\pi\rho\acute{o}\varsigma\ \acute{\epsilon}\nu^{34}$), and the equivocal per *analogia*³⁵, by saying that the first is a two-term relation and the second a four-term relation – we now need a different way of separating the two. Owens notes that the Scholastics mixed the two concepts together, but this does not fit with Aristotle referring to the two differently, using different words. An example of something being equivocal as referring towards some one thing can be found in a discussion of the equivocal in *Metaph.* K 1060b35-1061a7:

The term seems to be used in the way we have mentioned, like ‘medical’ and ‘healthy’. For each of these also we use in many senses; and each is used in this way because the former refers somehow to medical science and the latter to health. Other terms refer to other things, but each term refers to some one thing. For a prescription and a knife are called medical because the former proceeds from medical science, and the latter is useful to it. And a thing is called healthy in the same way; one thing because it is indicative of health, another because it is productive of it.

To offer but a tentative solution, as I do not want to discuss this issue at too great a length, it seems much more reasonable to find the difference between the two kinds in the different ways that they are said to be equivocal. To take analogy first, pounce, spine, and bone are said to share the same nature, in a certain way, without belonging under the same genera. So that they share the same nature in one way, but because they do not share the same genera they are also equivocal in another way. With the other kind however, it is not said to be the same because they in a certain sense have the same nature. Rather they are the same because they have the same goal, or are related to the same science – but in nature they are very different. So much for the difference between analogy and the $\pi\rho\acute{o}\varsigma\ \acute{\epsilon}\nu$ equivocal.

We have been discussing analogy in order to find a justification for Aristotle’s use of the expert-analogy. As you remember my theory is that the expert-analogy works through a shared genera, and that the terms are used univocally. Aristotle’s use of analogy as similarity between things of different genera does not then fit with the expert-analogy. This is both

³⁴ Viz. analogy of attribution, which is the scholastic term.

³⁵ Together with the equivocal by chance, these compose the classical trichotomy from Boethius’ translation of Aristotle’s *Categories*.

because these do not have a shared genus, and because they to a certain extent are equivocal. However, I noted that we need to take a closer look at many of these passages below. But first it might be preferable to clear away a few other related concepts.

V. 2. 2 **Metaphors (μεταφορά), images (εἰκόν) and likenesses (ὁμοιότητες)**

Three concepts are for Aristotle closely related to that of analogy. These are both the concept of image (εἰκόν), and likenesses (ὁμοιότητες), as we have seen above for Plato, and Aristotle also is the first to examine the concept of metaphors (μεταφορά)³⁶. Let us deal with them in order.

Aristotle defines metaphor in *Po.* 1457b6-9: “Metaphor consists in giving the thing a name that belongs to something else; the transference being either from genus to species, or from species to genus, or from species to species, or on grounds of analogy.” I.e. the name is transferred from what it properly refers to, on to something else. The term is then used not in its literal sense, but in a metaphorical one³⁷. Note that “the term *metaphora* is used for both the process of transference and the name so transferred.” (Janko 1987: 129) Following this definition he exemplifies each of the four types:

That from genus to species is exemplified in ‘Here stands my ship’; for lying at anchor is a sort of standing. That from species to genus in ‘Truly ten thousand good deeds has Ulysses wrought’, where ‘ten thousand’, which is a particular large number, is put in place of the generic ‘a large number’. That from species to species in ‘Drawing the life with the bronze,’ and in ‘Severing with the enduring bronze’; where the poet uses ‘draw’ in the sense of ‘sever’ and ‘sever’ in that of ‘draw’, both words meaning to ‘take away’ something. That from analogy is possible whenever there are four terms so related that the second is to the first, as the fourth to the third; for one may then put the fourth in place of the second, and the second in place of the fourth. Now and then, too, they qualify the metaphor by adding on to it that to which the word it supplants is relative. Thus a cup is in relation to Dionysus what a shield is to Ares. The cup accordingly will be described as the ‘shield of Dionysus’ and the shield as the ‘cup of

³⁶ Cf. Moran 1996: 385.

³⁷ Cf. *Top.* 123a33-35.

Ares'. Or to take another instance: As old age is to life, so is evening to day. One will accordingly describe evening as the 'old age of the day'—or by the Empedoclean equivalent; and old age as the 'evening' or 'sunset of life'. (*Po.* 1457b9-25)

You must forgive me quoting so extensively, but this really is a most central passage for understanding Aristotle's concept of metaphor. From this it is clear that metaphor uses and relies upon a relation between the thing transferred from and the one transferred to. The same thing is said in *Rh.* 1412a10-11: "Metaphors must be drawn, as has been said already, from things that are related to the original thing, and yet not obviously be so". There has to be some relation, some similarity, otherwise it will not be a good metaphor. "Metaphors like other things may be inappropriate." (*Rh.* 1406b6) "Metaphors, like epithets, must be fitting, which means that they must fairly correspond to the thing signified". (*Rh.* 1405a10-11) Of transference of a term where there is no likeness, he says that "such phrases are worse than metaphor [...]" (*Top.* 140a9) And it should also be noted that what is being transferred is a name (ὄνομα)—the name 'shield' is being transferred to Dionysus, etc. Now the four-fold division that has been described goes from that where there is a very close relation (i.e. from genus to species) to the more and more remote, the most remote being that from analogy³⁸. Thus there is the most transference of meaning in that from analogy, and based on the space that he devotes to discussing it, he thinks that the transference from analogy to be the most important type of metaphor. This is confirmed in *Rh.* 1411a1: "Of the four kinds of metaphor the most taking is the proportional kind." He says that metaphor is a third possibility to the equivocal and the univocal in *Top.* 139b32-140a17³⁹, but this passage is too obscure to make anything out of this. Owen's suggestion that metaphors use a term with a focal meaning, i.e. has one primary definition and a secondary closely connected definition, might be a way to understand it, though as said the textual basis is unclear.

Aristotle says that there are positive aspects of using metaphors:

It is a great thing, indeed, to make a proper use of these poetical forms, as also of compounds and strange words. But the greatest thing by far is to be a master of metaphor. It is the one thing that cannot be learnt from others; and it is also a sign of genius, since a good metaphor implies an intuitive perception of the similarity in dissimilars. (*Po.* 1459a4-8)

³⁸ Cf. Janko 1987: 129. Note that metaphor "is used in a wider sense than English 'metaphor,' which is mainly confined to the third and fourth of Aristotle's types." (Lucas 1968: 204, quoted in Ricoeur 1996: 370.)

³⁹ Cf. Owen 1960: 174.

The meaning here must be that metaphor is the greatest thing to master *in the poetical*, as one can see from the context⁴⁰. It is also said that metaphor relies on similarities (ὁμοιότητες), and remember that these similarities then will be of the four kinds of relations discussed earlier in this chapter. Further, metaphors give liveliness to a text⁴¹, improving the style (λέξις) of the work.

The use of metaphor outside of the poetical is however damagingly criticized by Aristotle⁴². Discussing definitions, he says at *APo.* 97b37-39 that “if one should not argue in metaphors, it is clear too that one should not define either by metaphors or what is said in metaphors; for then one will necessarily argue in metaphors.” Taken with the paragraph directly preceding, the impression is that metaphors should not be used because of their lack of clarity. “For a metaphorical expression is always obscure.” (*Top.* 139b34) Again, criticizing Empedocles’ use of metaphors, he says: “Metaphors are poetical and so that expression of his may satisfy the requirements of a poem, but as to knowledge of nature it is unsatisfactory.” (*Mete.* 357a25-28) On the whole, the conclusion must be that metaphors should be avoided, with the exception of in the poetical and in some circumstances rhetoric.

Image, or simile, is discussed only in the *Rhetorics*, and interestingly enough not in the *Poetics*⁴³. But in the discussion there, the difference between image and metaphor is pretty minimal. ‘They differ only by the presence or absence of a specific term of comparison: the particle like or as (*hōs*) [...] the simile says “this is like that,” whereas the metaphor says “this is that.”’ (Ricoeu 1996: 337-338). Let us look at the passages:

The simile also is a metaphor; the difference is but slight. When the poet says: ‘He leapt on the foe as a lion’, this is a simile; when he says of him ‘the lion leapt’, it is a metaphor—here, since both are courageous, he has transferred to Achilles the name of ‘lion’. Similes are useful in prose as well as in verse; but not often, since they are of the nature of poetry. They are to be employed just as metaphors are employed, since they are really the same thing except for the difference mentioned. (*Rh.* 1406b20-27)

Their difference is, as mentioned, very minimal. In the greek the difference is only the addition of ὡς δὲ. As it says later in the chapter, after mentioning quite a few examples of similes: “All of these ideas may be expressed either as similes or as metaphors; those which

⁴⁰ Cf. Janko 1987: 64 and his translation of *On Poets* Fr. 10: “Empedocles is Homeric and clever in expression, as he is metaphorical and uses the other things that succeed in the art of poetry.” Also cf. *Rh.* 1405a4-10.

⁴¹ Cf. *Rh.* 1411b24-25.

⁴² For a more thorough discussion of the positive and negative aspects of metaphors, vide Lloyd 1996: 208-212.

⁴³ Cf. Ricoeur 1996: 336.

succeed as metaphors will obviously do well also as similes, and similes, with the explanation omitted, will appear as metaphors.” (*Rh.* 1407a10-14) So that the difference is that the simile has the explanation, while the metaphor lacks it. Viz. that in the simile the transfer is stated explicitly, while in the metaphor it is left implicit. Of the two, Aristotle seems to prefer the metaphor: “The simile, as has been said before, is a metaphor, differing from it only in the way it is put; and just because it is longer it is less attractive.” (*Rh.* 1410b16-18) The difference between the two looks to be parallel with the difference between a substitution view metaphor and a comparison view metaphor⁴⁴. The substitution view holds that the metaphor substitutes one word for another, e.g. ‘Richard is a lion’ as a substitution for ‘Richard is brave’. The comparison view on the other hand holds that one compares the two, e.g. ‘Richard is like a lion’. Indeed, Black says that according to this view “the metaphorical statement might be replaced by an equivalent literal *comparison*.” (Black 1962: 35) To summarise, the image is for Aristotle nothing but a more lengthy metaphor.

However, one of the examples of image that he presents might be problematic. Referring to Plato’s *Republic* 488a ff. he says “there is the simile about the Athenian people, who are compared to a ship-owner⁴⁵ who is strong but a little deaf [...]” (*Rh.* 1406b34-36) The example which Aristotle here mentions is a typical example of the expert-analogy. I will not discuss the example in detail here, as I will do so below. But the short explanation of why Aristotle describes this as an image might be that he is referring to the use of the ship-owner in place of the Athenian people, and not to the analogy between the ship’s captain and the Athenian leader of state. It is the captain who is the expert, not the ship-owner, and thus the expert-analogy is not between the ship-owner and the Athenian people. So that the expert-analogy is the part that holds the argumentative strength, while the comparison between the ship-owner and the Athenian people is an image drawing a comparison between that particular ship-owner and the Athenian people. I.e. it says that the Athenian people is like this strong but rather deaf ship-owner, who is unable to see the expert and therefore gives over control of the ship to someone without the knowledge of how to steer it. But as I said, this is a

⁴⁴ This terminology and the examples used are from Black 1962 ch. 3. Black defends a third alternative, which he calls an interaction view of metaphor, where the meaning of both what the term is transferred from and what the term is transferred to interacts – changing the meaning of both. Though this view might have its credit, it does not concern our present inquiry as this view does not fit any theory of Plato or Aristotle, nor does it have a bearing on my proposed interpretation of the expert-analogy.

⁴⁵ W. Rhys Roberts translates in the *Complete works of Aristotle* “ship’s captain”, but the word, ναύκληρος, properly means a shipowner.

tentative explanation of how Aristotle could describe this as an image, and I will look in more detail on the passage from Plato later.

To sum up our discussion of metaphor and image, these concepts does not seem to give any justification of the type of analogy within a genus that I am defending. They are both concerned with the transference of names, not with inference from one particular to another under a common genus. There is the four-part division of metaphor to take into consideration, and Aristotle certainly makes use of the concepts of species, genus and analogy as variations of generality, but beyond this similar framework there are no common grounds with the expert-analogy. And beyond a doubt, if we are to find a justification for this kind of analogy, it will not be under the concepts of metaphor and image.

To move on to the concept of likenesses, it is a much wider concept than that of metaphor. It is clear that there must be some likeness and relation involved in a metaphor, and even that this varies depending on which of the four types of metaphor is in use. But likenesses are also used for finding syllogisms, inductions, definitions and analogies⁴⁶. “The instruments whereby we are to become well supplied with deductions are four: [...] fourth, the investigation of likeness.” (*Top.* 105a22-25) He then gives examples of these: “that the relation of the healthy to health is like that of the vigorous to vigour.” (*Top.* 105a30-31) As we can see, likeness is here exemplified with a proportional analogy. All these four are mentioned and discussed right at the end of the first *Topics*. “The examination of likeness is useful with a view both to inductive arguments and to hypothetical deductions, and also with a view to the rendering of definitions.” (*Top.* 108b7-8) Then he explains why likeness is useful for these three, and at the same time he mentions a type of analogy:

It is useful for inductive arguments, because it is by means of an induction of particulars in cases that are alike that we claim to induce the universal; for it is not easy to do this if we do not know the points of likeness. It is useful for hypothetical deductions because it is a reputable opinion that among similars what is true of one is true also of the rest. If, then, with regard to any of them we are well supplied with matter for a discussion, we shall secure a preliminary admission that however it is in these cases, so it is also in the case before us; then when we have proved the former we shall have proved, on the strength of the hypothesis, the matter before us as well; for we have first made the hypothesis that however it is in these cases, so it is also in the case before us, and have then produced the demonstration. It is useful for the

⁴⁶ Cf. Lloyd 1966: 408-410.

rendering of definitions because, if we are able to see what is the same in each individual case of it, we shall be at no loss when we define it; for the common predicates that which is most definitely predicated in what the thing is is likely to be the genus. Likewise, also, in the case of objects widely divergent, the examination of likeness is useful for purposes of definition, e.g. the sameness of a calm at sea, and windlessness in the air (each being a form of rest), and of a point on a line and the unit in number (each being a principle). If, then, we render as the genus what is common to all the cases, we shall get the credit of defining not inappropriately. (*Top.* 108b9-28)

First, Aristotle says that induction rely on the likeness between some particulars as evidence. Thus, likenesses here play an evidential role. Second, that hypothetical deductions rely on the reputable opinion (ἐνδοξία) that among similars what is true of one is true of all. Here likenesses are part of a premise underlying many hypothetical deductions. Third, likeness enables one to see the common predicate, which is most likely to be the genus. Fourth, this is also said for seeing that things widely apart (e.g. calm at sea and windlessness in the air) belong under a common genus, namely that of rest. Both the second and fourth of these looks remarkably much like the description that I gave of the expert-analogy. The same can be said for the discussion of likenesses in chapter 17 of *Topics* I. Here he first discusses likeness “in the case of things belonging to different genera, the formula being: as one is to one thing, so is another to another [...]” (*Top.* 180a7-8) He then gives two examples of this, both proportional analogies. The second type of likeness is “things which belong to the same genus, to see if any identical attribute belongs to them all, e.g. to a man and a horse and a dog; for in so far as they have any identical attribute, in so far they are alike.” (*Top.* 108a14-17) As we can see, the likeness within the same genus does not give rise to a proportional analogy, but instead a more direct relation. In this passage the emphasis is however on discovery, and not so much argument. But it is also applicable to argument, as seen in the quote from *Top.* 108b9-28.

To sum up, the concept of likeness seems to be closely related to the kind of analogy within a genus that I am defending, and it does hint at a justification for it. Though one might have the impression that likeness is something that one perceives, or that works as a premise or foundation of an argument, rather than it itself making up a form of argument. And I think the evidence points towards that conclusion. However, the discussion in the *Topics* is rather brief, and in addition it is not clear to what degree this can be applied beyond his dialectics. In contrast, we found that the concepts of metaphor and image do not hold any interest for our present inquiry.

V. 2. 3 Paradigm (παράδειγμα) and induction (ἐπαγωγή)

With the paradigm (παράδειγμα), viz. argument by example, and induction (ἐπαγωγή), we have the two key concepts that are usually linked with the expert-analogy. As we have seen above, the concept of induction was central in the discussion among previous commentators of the expert-analogy in Plato⁴⁷. Induction was there the key concept used when interpreting the expert-analogy. At the same time, the commentators on the expert-analogy in Aristotle just as often interprets it as a paradigm. E.g. “the main texts in which Aristotle deals with explicit analogical argument are those in which he describes and analyses the paradigm.” (Lloyd 1966: 405) Let us look in some detail on these two concepts to see how applicable they may be on the expert-analogy, beginning with induction.

If Aristotle’s conception of induction had been the same as our modern conception, it would hardly be advantageous to look at induction for our current inquiry. Our modern conception of induction, i.e. inferring from a regular occurrence that the same thing will happen in the future, has been shown to have serious faults. Its reliance on the principle of the uniformity of nature is problematic, and normally it is simply referred to as the problem of induction. “The man who has fed the chicken every day throughout its life at last wrings its neck instead, showing that more refined views as to the uniformity of nature would have been useful to the chicken.” (Russell 2001: 35) Largely because of this induction is today viewed as any kind of inference where the conclusion does not necessarily follow from the premisses. The type of analogical structure that I have proposed above does not have any similarity with this modern conception of induction.

Fortunately, induction for Aristotle is something quite different⁴⁸. Our word induction is etymologically related to the greek ἐπαγωγή, as *inductio* was the latin translation of the greek ἐπαγωγή (the non-technical meaning of both is to *lead on*). The first technical occurrence of *induction* is Cicero’s *De Inventione* 31⁴⁹, see also *Top.* 10⁵⁰, but already by that time the meaning had changed. Cicero’s conception of induction is actually Aristotle’s

⁴⁷ Viz. Robinson (1953), Santas (1979), Vlastos (1991) and McPherran (2007 & 2011).

⁴⁸ Cf. Annas 1976: 154: “[...] is not, however, the same as modern induction, but more like a generalization from one or more convincing examples.”

⁴⁹ “*Induction* is a form of argument which leads the person with whom one is arguing to give assent to certain undisputed facts; through this assent it wins his approval of a doubtful proposition because this resembles the facts to which he has assented.” Cic. *De Inventione* 31.

⁵⁰ “This form of argument which attains the desired proof by citing several parallels is called induction, in Greek ἐπαγωγή (epagoge); Socrates frequently used this in his dialogues.” Cic. *Top.* 10.

conception of the paradigm, and similarly his conception of deduction (*rationatio*) is that of an enthymeme⁵¹.

Robinson characterised the expert-analogy, and in general the use of cases, under the Aristotelian term induction (ἐπαγωγή). And later commentators have followed Robinson's terminology. Given this it is reasonable to think that Aristotle's concept of induction can enlighten our understanding of the expert-analogy. There are primarily two reasons for characterising the expert-analogy under induction. Robinson⁵² refers to *Top. A* 12:

Having made these distinctions, we must distinguish how many species there are of dialectical arguments. There are induction and deduction. Now what deduction is has been said before; induction is a passage from particulars to universals, e.g. the argument that supposing the skilled pilot is the most effective, and likewise the skilled charioteer, then in general the skilled man is the best at his particular task. (*Top.* 105a10-16)

If one accepts this dichotomy, then the expert-analogy is either induction or deduction. Since induction is here described as arguing from cases, and even cases of experts, the natural conclusion is that it is induction. While he did not do the same when discussing deduction earlier in *Top. A* 1. As a second point is the attribution that Aristotle makes to Socrates⁵³: “For two things may be fairly ascribed by Socrates—inductive arguments and universal definition, both of which are concerned with the starting-point of science.” (*Metaph. M* 1078b27-29) There is almost universal agreement that the inductive arguments referred to is the argument from cases, in particular the expert-analogies⁵⁴. Hamlyn 1976 argues for an alternative interpretation, namely that it is the type of argument used in the *Meno* 82b-85c when Socrates questions the slave-boy. I am inclined to accept McKirahan's conclusion in this regard⁵⁵, namely that 1078b27-29 gives insufficient data to conclude exactly what kind of argument Aristotle had in mind. Still, I would think it reasonable to assume that it is the expert-analogy that Aristotle had in mind, based on the frequency of its usage in both Plato and Xenophon. At the very least, based on these two points, there are good reasons for studying Aristotle's conception of induction when looking for a justification of the expert-analogies.

⁵¹ For the historical development of the conception of induction from antiquity to early modern time, see Milton 2009 and McCaskey 2006.

⁵² Cf. Robinson 1953: 20-21.

⁵³ An attribution that Cicero repeats in his discussions of induction, see above.

⁵⁴ For an example of this standard way of presenting it, vide e.g. Tuominen 2007: 59-60.

⁵⁵ Cf. McKirahan 1983: 3-4.

We are however faced with problems right from the start. Robinson was not blind to these problems, though he still thought it worthwhile to characterise the expert-analogy under induction. After proposing a definition, as well as citing Aristotle's definition from *Top. A 12*, he says the following: "Both my definition and Aristotle's present definition differ from his account of epagoge and what he calls 'the syllogism obtained from epagoge' in the *Prior Analytics* (II 23), and resemble rather closely his account of what he calls 'paradigm' in that work (II 24)." (Robinson 1953: 33)

Now *APr. B 23* is a highly controversial passage, and there is no clear consensus on how it should be interpreted. The chapter consists of three paragraphs, of which the second is the essential one. It begins saying that "induction, or rather the deduction which springs out of induction, consists in deducing a relation between one extreme and the middle by means of the other extreme, e.g. if *B* is the middle term between *A* and *C*, it consists in proving through *C* that *A* belongs to *B*." (*APr. 68b15-18*) He then gives an example of this, where *C* is particular long-lived animals, viz. man⁵⁶, horse, and mule, *A* is long-liver, *B* is bileless. He ends the paragraph saying that "we must apprehend *C* as made up of all the particulars. For induction proceeds through an enumeration of all the cases." (*APr. 68b27-29*) The most prevalent interpretation can be represented with Ross, where the chapter is said to describe perfect induction, i.e. one infers that 'all *X* is *P*' by surveying that every instance of *X* is *P*. "The present chapter must be regarded as a *tour de force* in which A. tries at all costs to bring induction into the form of syllogism; and only perfect induction can be so treated." (Ross 1949: 486) I.e. it reduces induction to deduction. Further, it is assumed that it is a survey of each species falling under the genus of bileless, and not a survey of each man, horse etc. that is or ever have been, as the first is seen as possible while the second is impossible⁵⁷. But this presentation of induction is at the same time seen as being in conflict with other uses of induction, and Ross says that perfect induction is the "least interesting and important kind [...]" (Ross 1949: 486) Thus this reading, though it is the most natural interpretation of the text, has a serious fault. Several alternative interpretations have been offered. 1) Pace Whewell one can say that it does not describe an inference, but rather a way of discovery. Induction thus understood is a way of connecting together two conception (e.g. long-liver and bileless) as a sort of working hypothesis. But there is very weak textual basis for this

⁵⁶ Whewell 1850: 320 objects to this, saying it was well known in Aristotle's time that man had a gall-bladder. He substitutes it with elephant (ἄνθρωπος substituted with ἐλέφας).

⁵⁷ Cf. Ross 1949: 486-487 and Ross 1995: 38-39.

interpretation⁵⁸. 2) Engberg-Pedersen supports a variant of this, and has suggested that the chapter is concerned with clarifying an aspect regarding all induction, namely that all inductions claim e.g. “(1) that *all* long-lived individuals (C) are gall-less (B) and (2) that B does not go beyond C.” (Engberg-Pedersen 1979: 313) Thus Aristotle is not solely concerned with perfect induction, rather he clarifies that all inductions makes certain claims, though these are claims that cannot be proved. Engberg-Pedersen finds this interpretation consistent with his understanding of induction as a dialectical method solely confined to gaining conviction, and where *nous* is responsible for ‘seeing’ the universal. However, his interpretation of the passage is solely based on the argument that this reading would be consistent with his understanding of induction. As this understanding has serious faults, as discussed by Upton, this interpretation does not seem viable. 3) Another way to interpret the passage is to say that it is not about induction at all, but rather a special form of deduction. “So there are two kinds of deductions, deductions of middled premises and deductions of unmiddled premises.” (McCaskey 2007: 354) The passage describes this second type of deduction, where instead of having a middle term connecting the major and minor, one has three terms where two are convertible with each other. McCaskey suggests that conversion works either from a thing and its definition, or a thing and a proprium of it. Viz. he interprets it thus that Aristotle presumes that all *B* are *C*, and all *C* are *B*. I find this interpretation tempting, but its presentation of conversion is not completely satisfactory. 4) Conversion is also central for Groarke’s interpretation, but he thinks that it is an induction, namely a form of intuitive induction⁵⁹. By studying a limited sample, *C*, one arrives at the intuition that *B* causes *A*. Thus it is primarily a method of discovery, but Groarke also thinks that it is a method of inference. The problem with this interpretation is that it looks like a *petitio principii* – it presumes what it sets out to prove.

I do not think any of these interpretations are entirely satisfactory. Let us therefore see if any of these interpretations can give any justification for our analogy by common genus. 1) Perfect induction does not fit, as the expert-analogies only use a few instances. And if they are then to be seen as incomplete inductions, the consequence would be that the expert-analogy would be fallacious. 2) As this view holds that induction is not an inference it clearly cannot help us. 3) This holds some interest, for given that this interpretation is correct, it would be reasonable to assume that the next chapter dealing with the paradigm should also be seen as

⁵⁸ Cf. Hamlyn 1976: 168-169.

⁵⁹ Cf. Groarke 2009: 130-131.

some kind of deduction. And this is exactly what I suggest below. But beyond this I cannot see any points of interest. 4) Intuitive induction does not seem to be anything like what we are looking for.

The other passages dealing with induction is much more straightforward. He compares it to likeness, which as we have seen had some points of similarity with the expert-analogy. He says it resembles induction, but that it is something different. “For in induction it is the universal whose admission is secured from the particulars, whereas in arguments from likeness, what is secured is not the universal under which all the like cases fall.” (*Top.* 156b14-17) Here again we see it stated that induction argues from particulars to the universal. To take yet another instance of this, at the beginning of *APo.* it is said that induction works by “proving the universal through the particular’s [*sic*] being clear.” (71a9) This standard way of defining induction, as inference from particular to universal, does not fit with the expert-analogy (being an inference from particular to particular). Induction and deduction is defined somewhat differently in *Rh.* 1356b13-18:

When we base the proof of a proposition on a number of similar cases, this is induction in dialectic, example in rhetoric; when it is shown that, certain propositions being true, a further and quite distinct proposition must also be true in consequence, whether universally or for the most part this is called deduction in dialectic, enthymeme in rhetoric.

Needless to say this second type of definition is less technical, and it views induction and example as belonging under the same definition (in contrast to the more technical definition that strictly separates them)⁶⁰. The interesting thing is that our expert-analogy seems to fit both of these definitions. However, I find it hard to get anything out of the definition in *Rh.* In contrast, *pace* Robinson, using the more technical definition it is clear that the expert-analogy falls under paradigm, and not induction.

Therefore let us now look at the concept of the paradigm. Aristotle’s discussion of the paradigm is confined to the *Rhetoric*, as well as *APr.* B 24⁶¹. At the beginning of *Rh.* B 20, after saying that paradigm and enthymeme are the two kinds of argument common to all of oratory, he says that the paradigm “has the nature of induction, which is the foundation of reasoning.” (*Rh.* 1393a26-27) However, one should note that the greek says that the paradigm is like (ὅμοιον) induction, and one should be cautious of concluding right away that paradigm

⁶⁰ For a more thorough discussion of the two definitions, see Burnyeat 1994: 16-21.

⁶¹ There are also some brief remarks in the *Rh. Al.* and in *Pr.* 18. 3.

is a kind of induction. That would be reading too much into the text. And the same holds for the second part of the sentence – it says that induction is the foundation of reasoning (ἀρχή), but not necessarily that paradigm also is a kind of foundation. It is clearer in *Rh.* 1356b2-3: “the example is an induction [...] But this in itself does not tell us much about the relation between the two. This is elaborated, after saying that paradigm is an argument from part to part, in *Rh.* 1357b29-30: “When two statements are of the same order, but one is more familiar than the other, the former is an example.” *Genos* is here translated as order, but one could just as well have translated it with genus. So that paradigm is related to induction, with the difference that it argues from one particular to another where both are under a common genus. In other words, paradigm is described as the type of analogy that I have been defending above. Let us look in more detail on the concept of paradigm.

In *Rh.* B 20 he says there are three varieties of the paradigm. The first is “the mention of actual past facts [...]” (*Rh.* 1393a29) He gives the following example: Darius did not cross the Aegean until he had taken Egypt, and the same with Xerxes. Therefore the present king of Persia will also cross the Aegean if he takes Egypt, and therefore the Greeks must stop him from taking Egypt. In other words, it is an analogy from an event in the past to a similar event in the future, inferring from what happened in the past incident to what will happen in the future event. The idea behind this first variety of the paradigm can be formulated as the maxim of George Santayana, that “those who do not learn from history are doomed to repeat it.” Call it an ‘argument from history’.

The two other varieties consist “in the invention of facts by the speaker.” (*Rh.* 1393b29-30) These two are “the illustrative parallel and the fable (e.g. the fables of Aesop, or those from Libya).” (*Rh.* 1393b30-31) The fable (λόγοι) is something very much like Plato’s concept of images (εἰκόνας), e.g. the image of the cave, the sun, and others⁶². Sc. the fable is a made-up story, where this story is used in order to infer on some actual issue at hand. I don’t think it necessary to elaborate in any greater degree on this type of paradigm. However, we will need to look in great detail on the illustrative parallel (παράβολη), as will be evident from the example he gives of this type of paradigm.

The illustrative parallel is the sort of argument Socrates used: e.g. ‘Public officials ought not to be selected by lot. That is like using the lot to select athletes, instead of choosing those who are fit for the contest; or using the lot to select a steersman from

⁶² Cf. Robinson 1953: 218-222.

among a ship's crew, as if we ought to take the man on whom the lot falls, and not the man who knows most about it'. (*Rh.* 1393b4-8)

It is clear that what Aristotle is here describing is an expert-analogy, and he even refers to it as Socratic⁶³. The discussion of paradigm in *APr.* B 24 is far from as clear as this, and there he only mentions the first type of paradigms. Still, there are points of interest in the chapter that are not found in the passage discussed just above, particularly as Aristotle here presents the logical form of a paradigm and separates it from induction, and I think it worthwhile quoting:

We have an example when the extreme is proved to belong to the middle by means of a term which resembles the third. It must be familiar both that the middle belongs to the third term, and that the first belongs to that which resembles the third. For example let *A* be evil, *B* making war against neighbours, *C* Athenians against Thebans, *D* Thebans against Phocians. If then we wish to prove that to fight with the Thebans is an evil, we must assume that to fight against neighbours is an evil. Conviction of this is obtained from similar cases, e.g. that the war against the Phocians was an evil to the Thebans. Since then to fight against neighbours is an evil, and to fight against the Thebans is to fight against neighbours, it is clear that to fight against the Thebans is an evil. Now it is clear that *B* belongs to *C* and to *D* (for both are cases of making war upon one's neighbours) and that *A* belongs to *D* (for the war against the Phocians did not turn out well for the Thebans); but that *A* belongs to *B* will be proved through *D*. Similarly if the conviction in the relation of the middle term to the extreme should be produced by several similar cases. Clearly then an example stands neither as part to whole, nor as whole to part, but rather as part to part, when both are subordinate to the same term, and one of them is familiar. It differs from induction, because induction starting from all the particular cases proves (as we saw) that the extreme belongs to the middle, and does not connect the deduction to the extreme, whereas argument by example does make this connexion and does not draw its proof from all the particular cases. (*APr.* 68b38-69a19)

This passage informs us on a few points about the paradigm. First, that it is an argument from one known particular to another similar but unknown particular, viz. that it is a form of analogy. In this case, the known particular is *D*, which we also know has the attribute *A*. At the same time, it is known that both *C* and *D* belong under *B*, where *B* is the genus of *C* and

⁶³ Cf. Gulley 1968: 14.

D, i.e. both *C* and *D* can be defined as wars made against one's neighbour. In the paradigm, one first infers that *A* belongs to *B*, since both *A* and *B* belongs to *D*. I.e. the single particular *D* is said to prove that the attribute *A* belongs to the genus *B*. That allows one again to infer that *C* is *A*, since it has been established that *A* is *B* and we already know that *C* is *B*. What can be thought as problematic in this example of paradigm is the inference that *B* is *A*, in other words how one can infer that the attribute belongs *per se* to the genus. Aside from this point the argument seems above reproach logically, though some could find faults with the emphasis of the argument – viz. of applying it to a particular case, thus falling short of pure science. Ross briefly explains these two potential problems:

The two characteristics by which *A*. distinguishes example from induction (69a17-19) both imply that it is not scientific but purely dialectical or rhetorical in character; in its first part it argues from one instance, or from several, not from all, and in doing so commits an obvious fallacy of illicit minor; and to its first part, in which a generalization is reached, it adds (in its second part) an application to a particular instance. Its real interest is not, like that of science, in generalization, but in inducing a particular belief, e.g. that a particular aggressive war will be dangerous to the country that wages it. (Ross 1949: 488)

The second potential problem mentioned, viz. that it is applied, can be ignored by us here. The minor point is that it is a problem that any analogy will be faced with, and the major that it is not necessary for us to go through Aristotle's view of science as this is a vast subject only remotely connected to our present inquiry. Let it suffice to say that though the example given may belong to politics rather than one of the sciences, what Aristotle does in this passage is present a form of argument, and that this form is not necessarily tied to politics or rhetoric. And thus the particulars may be of a more abstract nature. And after all, also the syllogism is an argument to a particular, though it argues from a universal.

The first potential problem depends on the reading of the following lines: “but that *A* belongs to *B* will be proved through *D*. Similarly if the conviction in the relation of the middle term to the extreme should be produced by several similar cases.” The standard way of interpreting these lines, pace Ross, is that one goes from a premise where the term, *B*, is not used with reference to its whole extensions – i.e. one is only talking about the species *D*, not the whole genus *B* – to a conclusion where it is used in its whole extension. But this is a breach of a syllogistic rule, the *illicit minor*. The second sentence, however, says that what is produced is *πίστις*, which can mean proof, argument, conviction and even plain persuasion.

The wording in the first sentence is also ambiguous, as the word translated with *proved* normally simply means *showed*. Thus, there is great variance at how strong one should take the claim. Most commentators view it as being persuasive rather than demonstrative, belonging under rhetoric⁶⁴. At the very least, there are strong indications that it is not an inductive proof by simple enumeration. It seems as if Aristotle is mainly thinking of *D* as a single example, and that he adds on as a second thought the line where it says that it is possible also to use more examples. But the adding of more examples does not seem to make any difference logically speaking to the validity of the conclusion. In *Rh.* 1394a10-18, he seems to be saying much the same thing. He says that it is preferable to first give an enthymeme⁶⁵, and then a single example. But if an enthymeme is not available, one must give a large number of examples. But supposing that Aristotle is consistent, this would mean that a syllogism or enthymeme should precede the paradigm presented in *APr.* B 24. I fail to find such a thing in the text, but it is possible to take it such that the syllogism should precede the paradigm in one's mind. To put it differently, that one has on a previous occasion demonstrated it with a syllogism or enthymeme⁶⁶. On this interpretation one presumes the demonstration that *A* belongs to *B*. And *D* works such that one recollects this presumed demonstration, illustrating *A* as belonging to *B* as an example of it. This is but a tentative and in part speculative reading of the passage, but understood this way the result is that there is no induction involved in the argument, and it is not guilty of making an *illicit minor*⁶⁷. This, if nothing else, is a point in favour of this interpretation. And in addition, the form of the paradigm will then be the same as my proposed form of the expert-analogy presented above. It will be an argument from one particular to another, where both belongs under a common genus, and where one presumes a previous demonstration proving that an attribute belongs to the genus *per se*. Still, assuming that this interpretation is correct, it has merely given us the form of the expert-analogy. We have not found a justification for the validity of this form.

⁶⁴ Cf. Lloyd 1966: 406-407.

⁶⁵ "Enthymeme is just a syllogism in which the propositions are not known to be true but believed to be probable." (Ross 1939-1940: 17)

⁶⁶ Alternatively, pace Lukasiewicz 1951, they are hypothetical, i.e. they contain the conditional *if*.

⁶⁷ This shares some points with, but should be kept distinct from, the interpretation of e.g. Groarke 2009. I.e. the view that a paradigm is composed first of an induction based on likeness, second an enthymeme applying the induced principle on a particular. The textual basis for this reading is *Rh.* 1402b13-21. After saying that enthymemes can be based on probabilities, examples, evidences or signs, he says: "Enthymemes based upon example are those which proceed from one or more similar cases, arrive at a general proposition, and then argue deductively to a particular inference." As this description does not seem to fit with the other passages discussing the paradigm (which I have discussed above), the reasonable conclusion (*contra* Groarke) would be to conclude that enthymeme based on a paradigm is something distinct from paradigm as discussed elsewhere. Cf. Groarke 2009: 218-220.

V. 2. 4 Identity by genus & identity by analogy

I suggest that the justification of the expert-analogy can be found by looking at Aristotle's division of identity. This division is to be found in many parts of his corpus, but it has mainly been discussed by the commentators on Aristotle's biology.

Before discussing this division I do however wish to make a precision on the concepts of genus and differentia in Aristotle. Up to this point these concepts have been taken for granted, without this invoking any problems. But when discussing Aristotle's biology, translating the Greek *genos* and *eidos* as genus and species are slightly problematic. The reason is that *eidos* in most, if not all, cases are not used for the biological concept of animal species. Pellegrin finds 4 uses of *eidos*: 1) a common sense, meaning 'appearance', 2) an historical sense, meaning the Platonic ideas, 3) a logical sense, as a sub-class of *genos*, and 4) a technical sense, as 'form' opposed to matter and as 'formal cause'⁶⁸. In contrast, he finds that when Aristotle "wants to designate an animal class (species or whatever) as coherent and autonomous, Aristotle uses the word γένος." (Pellegrin 1985: 99) Obviously this would result in problems when e.g. discussing Aristotle taxonomy of animals⁶⁹. Up to this point genus and species has been used solely for the logical sense of *genos* and *eidos*, even during the discussion of homology. Thus translating the terms as genus and species has not given us any problems. But it makes good sense when discussing Aristotle's biology to instead translate *genos* with 'kind' and *eidos* with 'form (of a kind)'⁷⁰. However, I want to continue to use genus and species in its purely logical sense, and the reader should not understand the terms to indicate a taxonomic system going from species to genus to family and so on.

For Aristotle identity is an equivocal term, and he operates with 4 types of identity. These are identity in number, in species, in genus, and in analogy⁷¹. Of these, identity in number is what we would normally call identical, e.g. that the person writing these lines are identical with me the author. Aristotle again divides numerical identity into three parts: identical in definition, in proprium and in reference to some accident, see *Top.* 103a23-31. This type of identity has received much attention, and is sure to do so in the future as well, but

⁶⁸ Cf. Pellegrin 1985: 97. See also Balme 1962.

⁶⁹ See e.g. Balme 1975.

⁷⁰ Pace Lennox 2001b: 160.

⁷¹ Pace Balme 1962: 88, the greek terms are ἀριθμῷ ἓν, ἀριθμῷ διαφέροντα εἶδει ταῦτά, εἶδει διαφέροντα γένει ταῦτά, and γένει διαφέροντα ἀναλογίᾳ διαφέροντα; i.e. one in number, different in number same in species, different in species same in genus, and different in genus same in analogy.

it is not necessary for our present inquiry to elaborate any further on it. As regards the other three types of identity, it is clear that identity in species is identical to a higher degree than identity in genus, which again is identical to a higher degree than identity in analogy. This is clear from the following passage:

Again, some things are one in number, others in species, others in genus, others by analogy; in number those whose matter is one, in species those whose formula is one, in genus those to which the same figure of predication⁷² applies, by analogy those which are related as a third thing is to a fourth. The latter kinds of unity are always found when the former are, e.g. things that are one in number are one in species, while things that are one in species are not all one in number; but things that are one in species are all one in genus, while things that are so in genus are not all one in species but are all one by analogy; while things that are one by analogy are not all one in genus. (*Metaph.* Δ 1016b31-1017a3)

He connects the concept of like with that of unlike, saying that “the uses of ‘unlike’ correspond to those of ‘like’.” (*Metaph.* Δ 1018a19) That which is identical numerically is not unlike, but that which is like in species can be unlike in number, etc. Thus there are varying degrees of likeness and unlikeness, going from that which is identical in number which is completely identical, through the 3 other kinds of identity, and lastly there is a 5th group which is completely unidentical⁷³.

Now our expert-analogy is obviously neither identical in number nor in species. It is neither an argument about a specific doctor nor an argument about doctors. Rather it argues from one (or more than one) expert to another expert. However, it is not so clear if it is an identity in genus or identity in analogy. This question has serious consequences for the validity and justification of the expert-analogy, and I will argue for the position that it is based on identity in genus.

Before looking at the passages in the biological works we should look at the discussion in *APo.* B 14. Here we find a justification for inferring an attribute on a species, as this attribute follows the genus. And then this is compared with doing the same in virtue of analogy. Allow me to quote the passage in full:

⁷² Ross follows Bonitz in this translation, though he notes that it might be that it should simply be translated with ‘category’. Cf. Ross 1924: A 304-305.

⁷³ Pace Balme 1962: 88, the ἀναλογία διαφέροντα; incomparables. See also Kirwan 1971: 151, which understands this group to be more narrow: “He does not say whether it is possible for two things to be other and not the same *anything*, but probably he would have thought that this is true of items in different categories.”

In order to grasp problems, one should excerpt both the anatomies and the divisions; and in this way, laying down the genus common to all the subject-matter, one should excerpt (if e.g. animals are under consideration) whatever belongs to every animal; and having got this, again excerpt whatever follows every case of the first of the remaining terms (e.g. if it is a bird, whatever follows bird), and always excerpt in this way whatever follows the nearest term. For it is clear that we shall now be in a position to state the reason why what follows the items under the common genus belongs to them—e.g. why it belongs to man or to horse. Let *A* be animal, *B* what follows every animal, and *C, D, E* individual animals. Well, it is clear why *B* belongs to *D*; for it does so because of *A*. Similarly in the other cases too, and the same account will always hold for the others.

Now at present we argue in terms of the common names that have been handed down; but we must not only inquire in these cases, but also if anything else has been seen to belong in common, we must extract that and then inquire what it follows and what follows it—e.g. having a manyplies and not having upper incisors follow having horns; again, we should inquire what having horns follows. For it is clear why what we have mentioned will belong to them; for it will belong because they have horns.

Again, another way is excerpting in virtue of analogy; for you cannot get one identical thing which pounce and spine and bone should be called; but there will be things that follow them too, as though there were some single nature of this sort. (*APo.* 98a1-23)

The chapter begins saying that when for instance studying an individual species⁷⁴ of animal one should first look at what belongs to the genus. Then the animal has these attributes because the animal is a part of the genus. Likewise for what belong to the species; then it has these attributes because it is a part of the species. In the next paragraph he says that one can infer from the animal possessing one attribute to it possessing another, if having the one follows from having the other. E.g. if not having upper incisors follow from having horns (as it belongs to the genus ‘horned animals’), and again having a third stomach follows from not having upper incisors. However these terms are not convertible, as e.g. the camel has a third stomach and lacks upper incisors, but it does not have horns⁷⁵. And in the last paragraph he

⁷⁴ Pace Barnes 2002: 250.

⁷⁵ Cf. Balme 1987: 87 and Balme 1992: 72-73. Also see the discussion on horns in *PA* Γ 2 and the discussion of stomachs in *PA* Γ 14.

says that one thing might also follow from another in virtue of analogy, even though the analogical parts do not share a common name and a single nature.

There is some disagreement on how one should understand the purpose of this chapter, specifically the opening words, “to grasp problems” (ἔχειν τὰ προβλήματα). Barnes says that it “is probably to acquire premisses appropriate to its solution” (Barnes 2002: 250), viz. to the solution of the problem. The problem could then e.g. be ‘does the deer have upper incisors or not’, the answer being a negative one because this follows from the deer being one of the horned animals. In contrast Ross follows a suggestion by Zabarella, and thinks that it is not concerned with finding premisses and solving problems, but of formulating problems scientifically⁷⁶. On this interpretation one reduces the unscientific problem of why the deer lacks upper incisors to the scientific problem of why horned animals lack upper incisors. These two interpretations are unified by Balme and Lennox, and this is the interpretation that I find most convincing. Balme summarises the chapter thus: “he says that by picking out what is common to animals and seeing what further attributes are implied by it, we shall see the cause of the specific attributes [...]” (Balme 1992: 72) Further, “the first necessary step is to pick out correctly the fundamental generic attributes, because they either are, or point to, the causes of the specific attributes: without the generic attributes, explanation cannot begin.” (Balme 1992: 73) Thus the cause of the specific attributes is to be found in a general attribute belonging to the genus. E.g. “to see deer, antelope and oxen as all horn-bearers is to recognize in them a common nature in virtue of which a number of features common to them can be understood.” Lennox 1987: 116) In contrast, it would not be possible to explain the features following from being a horned animal, if one only treated it at level of the species, e.g. deer. The passage thus states a methodological principle. Begin by looking at what belongs at the most general level, and then look at its species, etc. because the explanation of the attribute is found by connecting it to its proper subject⁷⁷. This same principle is found elsewhere in the *APo*. “E.g. having angles equal to two right angles belongs to isosceles and to scalene in virtue of something common (for it belongs to them as figures of a certain sort and not as different things).” (84b6-9)⁷⁸ And in *APo*. 74a26-b4 he says that if one knows separately that the equilateral and the scalene and the isosceles has two right angles, one does not know it

⁷⁶ Cf. Ross 1949: 662-663.

⁷⁷ Cf. Balme 1992: 170-171.

⁷⁸ The whole of *APo*. A 23 is of relevance.

universally of a triangle, and one does not have a universal demonstration. First then does one know it *per se* (καθ' αὐτό) rather than *per accidens* (κατὰ συμβεβηκός)⁷⁹.

This methodological principle is then connected together with the paragraph on analogy. In the example of the pounce and spine and bone, one can see that they have common attributes. However, one has not discovered the generic nature that explains these similarities. That nature is unknown to us, and therefore one does not have a name, a genus, that these three are gathered under – and therefore one also does not have an explanation for these common attributes. Such an explanation would presumably either be one by definition or by proprium, in order for it to be *per se*. It would obviously not be sufficient to just give it a name: “Aristotle evidently does not regard classification as arbitrary, serving only tidiness and convenience of reference. Its aim is to reveal the common causal attributes, and the specific attributes flowing from them.” (Balme 1992: 73)

The division between the identical in genus and in analogy is further developed in the biological works. Here the various parts of animals belonging under a common genus are said to differ in excess and defect (καθ' ὑπεροχὴν καὶ ἔλλειψιν), in contrast to those that are only identical by analogy⁸⁰. And it is because e.g. Water animals and Winged animals do not differ in excess and defect (viz. in degrees) that these two are not grouped under a common genus:

Groups that only differ in degree, and in the more or less of an identical element that they possess, are aggregated under a single class; groups whose attributes are only analogous are separated. For instance, bird differs from bird by gradation, or by excess and defect—some birds have long feathers, others short ones. Bird and Fish only agree in having analogous organs; for what in the bird is feather, in the fish is scale. (*PA* 644a16-23)

After this there follows a rather trivial argument why one should not study each species separately, rather than first looking at what is common to the genus as described in *APo.* B 14. The trivial argument given is that this would be needless repetition. But the argument given in the *Posterior Analytics* “provides a much more powerful reason for seeking to grasp common attributes according to kind, rather than case by case.” (Lennox 2001a: 170) It is peculiar that Aristotle does not give this explanation in the *PA*, but I see no foundation for speculating on this issue. The methodological principle is at least the same though the justification of it

⁷⁹ Although see Tiles 1983 for the problematic passage in *Metaph.* Δ 1025a30-34 where Aristotle says this is συμβεβηκός καθ' αὐτό.

⁸⁰ Cf. *HA* 486a16-b21, 488b30-32 and 491a18.

differs. After this follows a paragraph further explaining the difference between likeness in genus and in analogy:

It is generally similarity in the shape of particular organs, or of the whole body, that has determined the formation of the larger groups. It is in virtue of such a similarity that Bird, Fishes, Cephalopoda, and Testacea have been made to form each a separate class. For within the limits of each such class, the parts do not differ in that they have no nearer resemblance than that of analogy—such as exists between the bone of man and the spine of fish—but differ merely in respect of such corporeal conditions as largeness smallness, softness hardness, smoothness roughness, and other similar oppositions, or, in one word, in respect of degree. (*PA* 644b8-15)

It is not quite obvious how one should take the difference between the two. It is clear that though in general the identical in genus differ as to measurable variation of parts, such things as manner of life, actions, character traits etc. are also involved⁸¹. And likewise, one should not understand the identical in analogy too narrowly, and confine it to having the same function or relation. E.g. the bone of man and the spine of fish have more similarities than merely having the same function⁸². In addition function also seems to be an essential concept for Aristotle when discussing what belongs to a genus or a species, along with that of part⁸³. Balme even goes so far as to say that Aristotle bases the identical in genus on common function⁸⁴.

We are faced with some difficulty when applying this beyond its use in biology. Differences in such as softness and hardness seems at the very least to be limited to the empirical sciences. To say that a doctor is bigger or softer or smoother (and other measurable differences) than a captain is incomprehensible – yet both are experts, and thus belong under a common genus. Pellegrin has suggested that “the Aristotelian *genos* is, both in properties and in functioning, a *unity of contraries*.” (Pellegrin 1987: 318) The examples that Aristotle gives are contraries, which further admits of degrees. The soft is the contrary to the hard, but there are degrees of softness and hardness. Pellegrin supports this interpretation on *Metaph.* I 3-4:

[...] that which is different from anything is different in some respect, so that there must be something identical whereby they differ. And this identical thing is genus or species; for all things that differ differ either in genus or species, in genus if the things

⁸¹ Cf. Lennox 2001a: 171-172 and Balme 1992: 122.

⁸² Cf. Lennox 2001a: 168.

⁸³ Cf. *PA* 645b15-646a5.

⁸⁴ Cf. Balme 1992: 120.

have not their matter in common and are not generated out of each other (i.e. if they belong to different figures of predication), and in species if they have the same genus (the genus is that same thing which both the different things are said to be in respect of their substance). (*Metaph.* 1054b25-31)

Since things which differ may differ from one another more or less, there is also a greatest difference, and this I call contrariety. [...] For things which differ in *genus* have no way to one another, but are too far distant and are not comparable; and for things that differ in *species* the extremes from which generation takes place are the contraries [...] (*Metaph.* 1055a4-9)

And of the things which are dealt with by the same faculty the most different are contrary; for one science deals with one class of things, and in these the complete difference is the greatest. (*Metaph.* 1055a30-33)

We see repeated (from the passage cited from *Metaph.* Δ above) the point that things belonging to the same genus does so by belonging to the same figure of predication⁸⁵. In the first passage, it should not be taken to say that when they differ they still share some attribute, but rather that “if A differs from B in genus, B also differs from A in genus; if in species, then in species.” (Ross 1924: B 288) The attributes may differ in degree, but it still relates itself to the common genus⁸⁶. Cf. with a paraphrase given by Lennox:

For two individuals to differ in degree, they must both be the same general sort of thing. With respect to that *sort* they do not differ in degree. But the general sort is constituted of *features with range* – any sub-kind may have those features exemplified by different specifications of that range. (Lennox 2001b: 167)

In the next passage cited we see that contrariety is described as the maximum difference possible within a genus. I take this to mean that e.g. black and white are contraries, with various scales of grey being the various degrees of difference that are yet not contraries, as these differ in species. But white is not comparable to e.g. soft⁸⁷, as these differ in genus and are different figures of predication.

In the last passage cited it is further said that each science (ἐπιστήμη)⁸⁸ is confined to dealing with a single genus, this genus then being the science’s subject-matter. It is far from evident what implications this gives, but it seems reasonable to connect this with the passage

⁸⁵ And the two books should obviously be read together, cf. Ross 1924: B 288.

⁸⁶ Cf. Pellegrin 1987: 321.

⁸⁷ Except perhaps metaphorically.

⁸⁸ In this passage it is reasonable to assume that science is used in Aristotle’s broad rather than narrow meaning, including both the theoretical sciences and the various expert-knowledges.

from the *APo*. By studying a subject at its genus it is then possible to get an explanation, while if one study things across different genera a common explanation is impossible, the subjects being too far distant and incomparable. “It is the lack of a path between one *genos* and another which, in the theory of knowledge, is the basis of the doctrine of ‘the incommunicability of genera’ which has the consequence that there is only one science per *genos*. Nevertheless there is a possible relation between the *genē*, and that is the relation of *analogy*.” (Pellegrin 1987: 321-322) But at the same time it is clear that this analogy cannot, unlike a relation under a genus, give an explanation: “demonstration does not apply to another genus [...]” (*APo*. 76a22)

Aristotle further elaborates on the relation between contrariety, genus, and species in *Metaph*. I 9-10. Black and white men (and likewise man and woman) are contraries, but a black man and a white man still belong to the same species. In contrast such contraries as ‘with feet’ and ‘with wings’ do make a difference in species.

Perhaps it is because the former are modifications peculiar to the genus, and the latter are less so. And since one element is formula and one is matter, contraries which are in the formula make a difference in species, but those which are in the compound material thing do not make one. (*Metaph*. 1058a37-b2)

Pace Ross 1924: B 303, this should be interpreted so that accidental contraries (e.g. colour) does not make a difference in species, while per se contraries (e.g. footed or winged) makes a difference and will be a differentia modifying the genus. Further, the modification must be one in substance and not matter – though male and female are modifications of ‘animal’ and not ‘man’, they are modifications of matter and therefore man and woman belong to the same species. The implication for the difference between contraries under the same genus, and those without a common genus, must then be that those under a genus share the same form (λόγος), while those not under a genus differ in form.

However, this can be problematized somewhat. In the biological works what is analogous under one inquiry, may belong under the same genus in another. Pellegrin discusses *PA* 653b35 and 655a33, and says that “in the first case we have two *genē*, bony animals and cartilaginous animals, which have between them an analogical relationship; but in the second [...] bone and cartilage are two different ‘species’ of matter employed by nature as ‘support’ of the body [...]” (Pellegrin 1987: 329) A possible solution would be to say that the inquiry in the two cases are somewhat different, and so is the form that they inquire on.

To sum up our current discussion, we can say that the identical by analogy is different from the identical by genus. The difference is that the identical by genus shares the same form. However, this form is differentiated over various contrarities (the more or less), and these contrarities belonging per se. Two species thus share the same form, but has different per se attributes (either in the form of the differentia in the definition or different proprium). And the study of each genus belongs to a separate science. The identical by analogy does not share the same form, and are in a certain sense incomparable and in another sense similar. As they do not have a common genus there is no science which field of study are these analogical features, and there is no common explanation behind them.

Undoubtedly the form of the expert-analogy outlined above fits perfectly with the theory of the identical by genus. Aristotle's discussion of this gives a good justification for drawing inferences from two species under the same genus. On a certain level of generality the two particulars are seen as identical, as sharing the same form, and therefore validating an inference from the one to the other.

V. 3 Concluding remarks on the justification of the expert-analogy

In the previous section we have seen how my interpretation of the structure of the expert-analogy fits with Aristotle's concept of paradigm, provided that one interprets this as an argument from particular to particular, through a genus *that is assumed*. Robinson found hints of the same in Plato, but with Aristotle we have a conception and discussion of it. Further, we found a justification of it in Aristotle's division between the identical in genus and the identical by analogy. I do not think this justification is necessarily in conflict with Plato, and at the very least it is less so than e.g. Plato's use of imagery and metaphors. The expert-analogy should not be taken to argue from appearances (thus contrasted with imagery and metaphors), but instead between ideas that are coordinate under a genus. Yet a few issues related to our interpretation of the expert-analogy are still left unanswered.

First, there is the question whether the expert-analogy can be said to be a valid deduction. Aristotle's definition of deduction is pretty close to our modern one, saying that "when it is shown that, certain propositions being true, a further and quite distinct proposition must also be true in consequence [...]" (*Rh.* 1356b15-16) This certainly seems to hold for an inference from one species to another. The form looks valid, and if the premisses are true the

conclusion should be valid. The commentators on analogy in Aristotle seem unanimous on this. Speaking on the concept of analogy Olshewsky says that “there is no problem for its use within a particular genus, but there is a necessary ambivalence about its role beyond.” (Olshewsky 1968: 9) Lloyd presupposes the same when he says the following:

But how, if sameness and oneness by analogy *transcend* the genus, as in both the metaphysical and the zoological uses, does that not breach those requirements? How can there be understanding, in the strict sense there defined, of any such cases, if understanding is limited to the genus? (Lloyd 1996: 142)

However, the argument could still be criticised. Aristotle requires that the premisses “be both explanatory and more familiar and prior [...]” (*APo.* 71b29-30) Viz. one should both infer from what is better known to what is less known, and it should be explanatory. It should be obvious that e.g. in the expert-analogy the expert which one infers from should be better known than the one we infer to. Thus this requirement is satisfied. Further the attribute inferred should belong per se to the genus, either belonging to the definition or be a proprium. In this regard it is in a certain regard explanatory, as it points to the genus where the explanation is to be found. In contrast, an analogy without a common genus would not satisfy this requirement. Nor does the expert-analogy seem to use any fallacies *in dictione*. The terms are used univocally, i.e. they do not for instance use a metaphorical meaning in one premise, or in general use a term in two different meanings.

There are better reasons for thinking it might use a fallacy *extra dictionem*, namely it can be argued that it is a *petitio principii* (begging the question). And related to this is the charge that it is a truism. Let me first deal with the charge of truism. It could be argued that the expert-analogy would not be an inference, but rather one would just be pointing out something self-evident. Take for instance the following expert-analogy: If the general should command the army, then the statesman should command the state. Pace Vlastos⁸⁹ one could say that the conclusion is built into what an expert is. The expert is the one that should do the task that he is an expert on. There is a truism when one says that ‘he is a bachelor thus he is an unmarried man’, because being an unmarried man is what a bachelor is. It follows by definition. However, a truism is such that it states something that is self-evident. Yet the usage in Plato and Aristotle of the expert-analogy gives us no indication that the conclusions

⁸⁹ Cf. Vlastos 1991: 268.

arrived at are self-evident. The conclusions are, almost without exception⁹⁰, accepted, but there are no textual indications that they are self-evident. In fact, the conclusions that Socrates' interlocutors are made to accept are often surprising to them. Take e.g. the discussion in *Rival Lovers* 136a-e, where Socrates' interlocutor proposes a definition of the philosopher. After a few expert-analogies, all ending in a *reductio ad absurdum*, the interlocutor is forced to accept the conclusion that philosophy is actually useless. If the analogies had been self-evident, this would hardly have happened. Yet it is frequent in Plato's dialogues. Likewise, it is extremely unlikely that Aristotle would make use of expert-analogies as frequently as he does, if their conclusion had been self-evident.

The charge of it being a *petitio principii* is related to that of it being a truism. With a truism the conclusion is built into the key term, while with a *petitio principii* the conclusion is built into one of the premises. At the same time there is an essential difference between the two. The premises in a valid deduction must necessarily contain the conclusion, but the truth of the premises should not depend on the conclusion. "Now the essence of a *petitio principii* is that it assumes two propositions of which one or other cannot be known unless the conclusion is already known [...]" (Ross 1939-1940: 17) It is clear that one can know something about the genus and one of its species without necessarily knowing one of its other species. One must know that what one infers to is a species of the common genus, but the premisses can be proven independent of proving the conclusion. E.g. 1) The doctor can charge money for the teaching of medicine because he is an expert. 2) The logician is an expert. 3) Therefore the logician can charge money for the teaching of logic. The first premise can be proved by the fact that students pay to learn medicine, and they do so because the doctor has expert knowledge, and further because he is an expert he has the ability to convey that knowledge to others. The second premise can be proved by knowing that logic should be defined as an art. And the conclusion would not be self-evident before Aristotle begun teaching logic, and thus wouldn't be a truism. So the premises in an expert-analogy do not necessarily assume the conclusion, though like all deductive arguments they might do so⁹¹. Though if the attribute inferred is one belonging to the definition of the genus, so that one could only know that it belonged to the genus by observing that it possesses that attribute, one would be guilty of committing the fallacy. In contrast to if one infers an attribute that is a proprium but not a part of the definition.

⁹⁰ Callicles in the *Gorgias*, and partly Protagoras in the dialogue of the same name, are the main occurrences, cf. Roochnik 1996 ch. 3. Also in some respects Thrasymachus in *R.* I. cf. Henderson 1970.

⁹¹ Cf. Joseph 1916: 301-304.

However the fallacy of *petitio principii* is not relevant if one is constructing a *reductio ad absurdum*, which Socrates frequently does. Such an argument sets out to prove that one of the premises is not true, and does therefore not assume that all the premises are true.

Second, one is faced with the question why one should use an analogy rather than a deduction. I.e. why argue from a particular and assume a genus working as a universal, rather than just use a universal premise? Here I can but give a few suggestions. First, there might be a dialectical reason for doing so. Leaving the universal implicit can make the interlocutor accept a premise that he otherwise would not give his assent to, since with the universal made explicit it might be easier for the interlocutor to spot where the argument is going. Cf. *Top.* VIII 1: “The necessary propositions through which the deduction is affected, ought not to be propounded directly in so many words. Rather one should keep as far away from them as possible.” (*Top* 155b28-30) Often Socrates depends on the interlocutor not understanding where the argument is going, since if the interlocutor understood that he would not accept the necessary premises⁹². Second, Aristotle notes that it is easier to spot equivocity in the particular than in the more universal:

And it is easier to define the particular than the universal—that is why one should cross from the particulars to the universals. For homonymies escape notice in what is universal more than in what is undifferentiated. (*APo.* 97b28-30)

As we know it is necessary in a deduction for the terms to be used univocally, and thus there could be some value in giving a particular and leaving the universal implied. Further Aristotle says that the particular is nearer by our senses while the universal is nearer in explanation (e.g. *Ph.* 189a6-8), but this is hardly applicable to Plato. Third there are rhetorical or poetical reasons for rather using particulars; see the discussion of paradigm, metaphors and images above. Needless to say none of these suggestions, taken together or separately, are entirely satisfactory. We can but be satisfied with the fact that analogies are used by Plato and Aristotle, and that they can be valid and sound inferences.

⁹² Cf. Robinson 1953: 38-9.

VI Discussion on a few cases of expert-analogies

In many cases it would be obvious that our expert-analogy would be identical by genus. An argument from one established expert, e.g. the doctor, to another established expert, e.g. the ship's captain, has a common genus and shares in a sense the same form. It is perhaps not so obvious if arguing to a non-established expert, e.g. Plato arguing from the ship's captain to the politician. Even more so when Aristotle argues from the doctor to the moral agent, as we do not typically think of these as sharing a common name and form.

I will be looking at a selected few examples of the expert-analogy, viz. passages that are normally thought to be problematic. First seeing if they can be interpreted as an inference between two species of the same genus, and second seeing if this interpretation can improve our understanding of these examples.

VI. 1 Plato's analogy of the captain and the politician in *R. VI* 488a-489c

First, let us look at the analogy of the ship in *R. VI* 488a-489c. The context of the passage is a question raised by Adeimantus: "How, then, can it be true to say that there will be no end to evils in our cities until philosophers—people we agree to be useless—rule in them." (*R.* 487e) Plato answers this by presenting an image of a ship where the ship-owner is hard of hearing, short-sighted, knows little of seafaring, but is bigger and stronger than anyone else on board. The sailors flock around him, stupefies the ship-owner with wine etc., and attempts to persuade him to let control over the ship over to oneself. And those who do succeed in persuading him are often killed by the others. The one who manages to acquire control of the ship are called the captain, but all the while the true captain who possesses the expertise is seen as a useless stargazer. And Plato says that the ship in the image resemble cities and their attitude to the true philosopher. Further, the true captain does not beg the sailors and ship-owner to allow him to rule over them (in contrast to the sailors in the image). Rather, the natural thing is for them to come begging to him. And it is the same with the true statesman – he does not beg the citizens like the politicians that now rule, but instead the citizens should come begging to him.

Bambrough says that “Plato takes the crucial step in the wrong direction when he draws a parallel between a governor’s choice of a policy and a navigator’s setting of a course [...] The true analogy is between the choice of a policy by a politician and the choice of a destination by the owner or passengers of a ship.” (Bambrough 1971: 194) I think Bambrough misses the point. Although it might be true that the statesman sets the goal as well as directing the city towards this goal, it is not clear that Plato held this view of the statesman – and this analogy indicates that he probably did not. Further, Tiles, in his criticism of Bambrough, remarks that the analogy is to the ship-owner, not the captain: “Plato does not speak of a ‘navigator’, a ‘κυβερνήτης’, but a ‘ναύκληρος’, which strictly means ‘ship-owner’...” (Tiles 1984: 60) But this is also a misunderstanding. It is actually a proportional analogy, saying that the relation between the ship-owner and the captain is analogous to the relation between the citizens and the statesman (i.e. the philosopher king). One infers from the proposition that the captain is the one who should rule the ship to the conclusion that the philosopher is the one who should rule the city. This is done by a *reductio ad absurdum*, showing what it would be if the captain did not rule the ship – yet, this absurd situation is the one that the statesman is in. But the analogy is more than just a proportional analogy. In presenting the absurd situation of the true captain being ignored, and not being allowed to steer the ship, Plato is giving an image. And indeed he describes it himself as an image. It is a fictional story that has never happened, but is imaginable. In addition the comparison between the ship-owner and the *dēmos* does not seem to have as close relationship between each other as that between the statesman and the captain (for some elaboration of this see above).

But the passage also contains an expert-analogy with the type of structure as I have presented above. Both the captain and the statesman (viz. philosopher) are experts. 1) The captain is the one who should steer the ship because he is the expert. 2) The statesman is an expert. 3) Therefore the statesman is the one who should rule the city-state. This assumes that governing of the city-state is the subject that the statesman is an expert on, but I think that is a premise that can be assumed. One can of course reject the second premise, and say that there in fact is no such expertise. In that case the argument would not be sound, but it would still be a valid argument. And it is the same with the second part of the argument. 1) The captain should be asked to steer the ship because he is an expert⁹³. 2) The statesman is an expert. 3)

⁹³ Cf. with the presentation of the concept of the expert above, where this attribute was seen as essential for an expert.

The Statesman should be asked to rule the city-state because he is an expert⁹⁴. An implication of this is that it is not the philosopher who is at fault for the widespread view that the philosopher is useless, as the fault lies in the *dēmos* not asking the philosopher to rule⁹⁵.

These two expert-analogies add quite a bit of content to the proportional analogy, and actually explain why the relation between the captain and the ship-owner is the same as the relation between the statesman and the city-state. The explanation is that both are experts. Thus this tie in with the Aristotelian methodological principle that an explanation should be sought at the highest genera, as the attribute then will belong to this genus per se, whereas it would just be accidental to the species. To sum up, I think my proposed structure of the expert-analogy is helpful for analysing and understanding this argument⁹⁶.

VI. 2 Medicine and gymnastics as care for the body, philosophy as the care of the soul

A particularly frequent expert analogy is that between medicine/gymnastics on the one hand and philosophy, viz. justice, on the other hand. While the first is said to be concerned with the health of the body, the second is concerned with the health of the soul. We have briefly touched on this issue above in the discussion on Santas and his interpretation of *Cri.* 47a-48a, where Santas suggested that one must presuppose the argument in *Grg.* 464a-465e. This is but one of many uses of the analogy between care of the body and care of the soul in the *Gorgias*⁹⁷ (also 504a-505b, 517c-518a, 520a-522c). The analogy is also of central importance in *R.* 444c-445b, right at the end of book IV.

⁹⁴ This second argument can also be found in *Pol.* VII. 2, 1324b29-36. Note what Aristotle says: “The other arts and sciences offer no parallel [...]” Also for Aristotle the statesman is an expert, and in *EN* I. 2 he is even said to be the master expert. Though it occasionally also seems to fall under practical wisdom, cf. Reeve 1992: 75-6.

⁹⁵ This implication is noted in Benson 2011: 231.

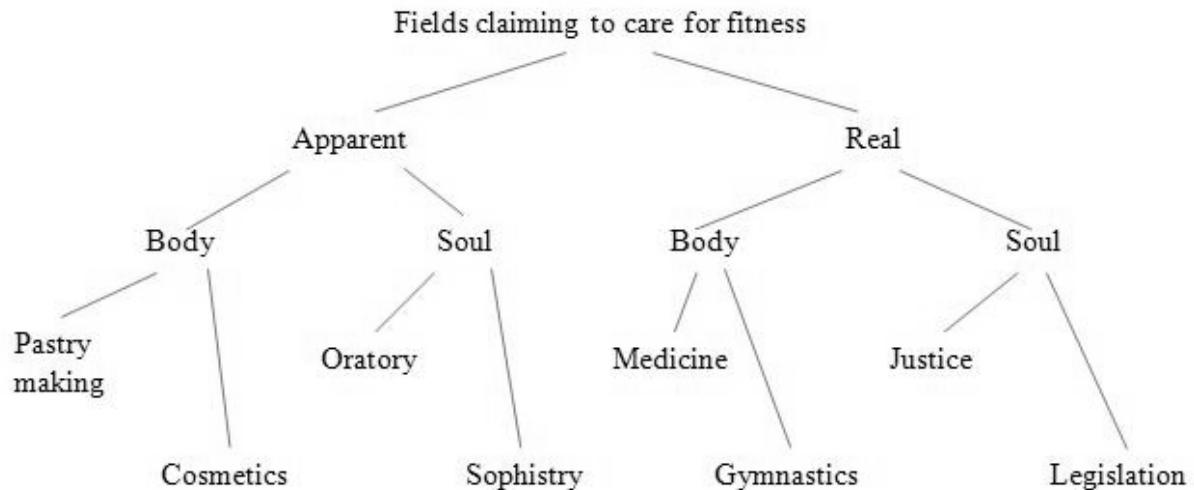
⁹⁶ Another analogy using the captain can be found in the Hippocratic *VM* 9. Pace Jaeger 1957: 56 Plato took his example from this chapter. It is an analogy between the doctor and the captain. So long as the captain is sailing in calm sea one does not notice that he is a bad captain. But once the storm overtakes the ship, he will have caused the ship to be lost. And the argument goes that the same applies for a doctor. So long as they are treating patients with no serious complaint, the layman does not spot that he is a poor doctor. But if he gets a patient with a severe illness, then his deficiency is shown to all. The genus here are the expertise, but more precise than that it is the various expertise that are stochastic (τέχνη στοχαστική), i.e. that involves to some extent chance. This kind of expertise has the proprium that chance can take over for the expertise, thus accomplishing the same goal. Thus both an incompetent captain and an incompetent doctor are mistaken to be good when chance accomplishes the goal for the expertise. And if these premises are true, then the analogy would be perfectly sound.

⁹⁷ Gorgias himself drew an analogy saying that rhetoric is caring for the soul as medicine is caring for the body. See chapter I. 2 above.

In *Grg.* 464a-465e, the passage begins by saying that there is such a thing as a body and a soul, and that there is a state of fitness for each. There is also a state of appearing to be fit, such that only a doctor or gymnastic trainer would notice that the person's body is not fit. Socrates then proposes that there is also such a thing for the fitness of the soul. Further, he says that there is *one* expertise for the fitness of the body, but that this expertise has two parts: medicine and gymnastics. Socrates again argues that it is the same for the fitness of the soul. There is one expertise, politics, with the two parts such that legislation is the counterpart to gymnastics, justice the counterpart to medicine. "Each member of these pairs has features in common with the other, medicine with gymnastics and justice with legislation, because they're concerned with the same thing." (*Grg.* 464c) At the same time there are four corresponding knacks (ἐμπειρίαν) concerned with the appearance of fitness, which masks themselves with the corresponding expertise, pretending to in fact be the expertise. E.g. "pastry baking has put on the mask of medicine, and pretends to know the foods that are best for the body [...]" (*Grg.* 464d) If forced to compete before foolish men, on the question of which was the expert on good food and bad, the doctor would lose to the pastry baker. In the same way cosmetics masks itself as gymnastics, giving people an alien beauty instead of their own beauty that comes about through gymnastics. Then Socrates argues that "what cosmetics is to gymnastics, sophistry is to legislation, and what pastry baking is to medicine, oratory is to justice." (*Grg.* 465c) But since these activities are so close, the sophist and the orator tends to be mixed together – and indeed if there had been no soul to govern the body, then medicine and pastry baking would be mixed together as well.

This passage contains several analogies. Let us attempt to separate them into distinct and valid analogies. But first, the passage seems to mainly depend on a set of concepts that are related to each other like this⁹⁸:

⁹⁸ For a somewhat different interpretation, see Roochnik1996: 183. I think my interpretation, which sees the various expertise to be connected to each other by higher genera, to be highly preferable.



One might say this passage is an early use of the Platonic method of division (διαίρεσις). There are however some remarkable differences between what we have in this passage compared to the passages using division in e.g. the *Sophist* and *Statesman*. There his concern is to do division until one comes to the term one is looking for, and this division is then the basis for a definition. E.g. if one was discussing justice one could say that the fields claiming to care for fitness can be either for the apparent or real fitness, then that this could be divided into the fitness of the body and of the soul, and that the fitness of the soul could be divided into outward fitness and inner fitness⁹⁹, viz. justice and legislation. Justice could then be defined as the real care of the soul's inner fitness. But this is clearly not what our passage does. Rather it explains these interconnected concepts, drawing analogies from one to another. As one can see the concepts are ordered in species under higher and higher genera. The genera are each divided into two using a contrary attribute, e.g. apparent and real. To a certain extent they infer parts of this structure from the structure of an analogous part.

Now the first analogy is in 464a-b. From the cases of medicine and gymnastics, it is said that only an expert in these fields can separate the apparently fit person from the person that is really fit. From this it is inferred that the same applies for the experts on the fitness of the soul¹⁰⁰, namely that they can separate the apparently fit person from the person that is really fit. This analogy infers something that is not obvious, that the expert in justice can spot that which is merely apparent fit in soul, from an analogous case where this attribute is

⁹⁹ This is not explicit, but I think the contrary attribute that here is the differentia is that one is care for the inner fitness while the other is care for the outer fitness. Alternatively one can take it to be the difference between the producing and the restoring, cf. Santas 2001: 133. But my interpretation does not depend on either reading.

¹⁰⁰ The name of these has not yet been given.

known. The analogy says that if the expert of medicine or gymnastics has this attribute because it belongs to the genus of expertise that care for real fitness, and if the expert in justice belongs to this genus as well, then the conclusion is valid. As one can see the analogy has the structure which I have presented above, and fits perfectly with the proposed justification of the structure given by Aristotle.

After this (464b-465b) there follows an explanation of the connection between the various concepts, presenting the structure as illustrated above. Then it is finally said that “what cosmetics is to gymnastics, sophistry is to legislation, and what pastry baking is to medicine, oratory is to justice.” (*Grg.* 465c) I have tried to indicate this relationship by separating the eight expertise/knacks into two groups of four, one of these being a line further down than the other. The analogies given can then be formulated as two proportional analogies. Thus the first proportional analogy is saying that the relation between cosmetics and gymnastics is the same as the relation between sophistry and legislation. And it is likewise for the other proportional analogy. But if one were to take this passage as only indicating these two proportional analogies, ignoring the structure as presented above, one would but see a small part of the analogies. The proportional analogy in itself only says that e.g. cosmetics and gymnastics both claims to accomplish the same goal, only that cosmetics does so apparently while gymnastics does it actually. But on the basis of the structure of species and higher genera, one can actually make countless analogies. And these analogies will then be of the same form as the analogy in 464a-b, i.e. an analogy based on identity in genus. And indeed, Socrates does make several analogies based on this structure.

In 504a-505b there is a couple of analogies based on this structure. First it is stated that physical trainers and doctors, as well as other experts, does not do whatever he does randomly, but rather he gives order and organization to e.g. the body. From this it is inferred that the expert on justice and legislation performs his expertise by giving order and organisation to the soul. Again this analogy can be made valid by presupposing that these share a common genus, and that this attribute, viz. that the expert gives order and organization to his subject, belongs per se to this genus. In this analogy we see perhaps a weakness in the structure between the various concepts as presented above¹⁰¹. Here he also refers to other expertise than medicine and gymnastics. It would then actually be preferable to organise medicine, gymnastics, justice and legislation under a sub-genera of all expertise. But this is a criticism of the soundness of the argument, and I do not think it would be too hard to alleviate

¹⁰¹ The Platonic method of division was criticised by Aristotle partly because of this fault.

this deficiency by slight changes in the structure of the concepts. The next analogy, from 504e-505b, says that a doctor does not allow a sick patient to eat and drink as much as he wants, i.e. to fill his appetites, as this would be harmful to the patient's health. Thus when the soul is sick, the just man will not allow the sick soul to fill his appetites as this would be harmful. Again one must assume, to make the analogy valid, that this attribute belongs to the doctor because he is an expert concerned with fitness, and that the just man is also an expert concerned with fitness – which he is according to the illustration above. Some implications of this analogy seem to be deduced in *Grg.* 506d-507c, and it surely presupposes the analogies in 504a-505b.

Then in 517c-518a Socrates complains that Callicles several times has accepted the analogy between the care for the body and the care for the soul. But still he refuses to see the implications of this analogy. And a further analogy is given. It is said that various knacks (or possibly expertise can be allowed here) concerned with the body, e.g. a breadbaker, pastrychef, weaver, etc. are subservient, fulfilling any appetite one might have. But the proper expertise, gymnastics and medicine, are mistresses of these subservient ones¹⁰², because they have knowledge of what food and drink is good. Socrates then says the same holds for politics, which is the commanding expertise with knowledge of which of the appetites are good and bad. And this is the specific analogy that he says Callicles refuses to accept. Again, the analogy must assume that politics (viz. the expertise concerned with justice) shares a common genus with that of medicine, like the one given in 464a-465e, and that this attribute of being a commanding expertise over others belongs to this genus per se, and only accidentally belongs to medicine and gymnastics. If so, the analogy once again has a valid logical structure.

There are several analogies in *Grg.* 520a-522c. The first says that “sophistry is more to be admired than oratory, insofar as legislation is more admirable than the administration of justice, and gymnastics more than medicine.” (520b) The analogy says that because legislation is more admirable than justice, and gymnastics more than medicine, then sophistry is more admirable than oratory. As we have seen above, Plato thinks these six expertise can be sorted into two groups. It is however not clear why the one is said to be more admirable than the other. And again, we see a problem with Plato's method of division. Still, he obviously thinks these two groups make up two different genera, and that one of these genera

¹⁰² A parallel idea can be found in Aristotle's *EN* I.1-2 1094a1-b12, where politics is said to be the most authoritative and master expertise.

is per se more admirable than the other. And thus the analogy has a valid form, though there seems to be some problems with the soundness of the analogy.

After this there follows a deductive argument, explaining why it is wrong to take payment for giving advice on justice, when this is fine to do for all other expertise. The answer is that since the effect of this advice would be to make the person advised just, that person would then, because he has become just, himself desire to return the benefit as best as he can. Take notice that this is an attribute said to belong to the expertise of justice alone, and hence no analogy to any other expertise is possible. Instead it is contrasted to all other expertise.

Next in 521a an analogy is given. Socrates asks if the care for the city is like a doctor or like one ready to serve. Since Callicles says it is like one ready to serve, Socrates then infers that care for the city will be a form of flattery. This analogy depends on what was said above, namely that the pastry-maker and the like are flatterers, while medicine governs these and says which appetite should be fulfilled. This is continued in 521d-522c. Socrates says he is the only one among contemporary Athenians to practice the true political expertise. Then he basically repeats the analogy from 464a-465e, indeed Socrates says that “the same account I applied to Polus comes back to me.” (*Grg.* 521e) Namely that if the doctor was put into a court of children by the pastry chef, then the doctor would lose the case. And likewise, if Socrates was put into a court of children (or adults that are like children) by an orator, then Socrates would lose. Here again the analogy is valid if the true expertise concerned with fitness per se has the attribute that the true expertise would lose against the apparent expertise in a court of children, and if Socrates is a true political expert.

Finally there is the analogy in *R.* 444c-445b. It begins saying that “just and unjust actions are no different for the soul than healthy and unhealthy things are for the body.” (444c) Now to produce health in the body, one must order the body into the by nature¹⁰³ ruling and ruled¹⁰⁴. Therefore to produce justice in the soul, that which by nature should rule and be ruled should be set in this order. Again the analogy assumes that these share a common

¹⁰³ This should probably be taken to refer to a teleology. And any expertise is in any way teleological, aiming for some goal. Cf. Santas 2001: 135-137 and Irwin 1995: 252-254.

¹⁰⁴ It is not clear how to take this premise. It can either mean that one must have the expertise of medicine, and this then orders which appetites should be fulfilled and which should not. This would tie in with *Grg.* Or it can be taken to refer to the Hippocratic theory of powers, and that health is caused by a moderate blend of these powers (e.g. moderate temperature, not too much phlegm and bile) I think the first interpretation is the one to be preferred. while the second fits better the discussion in *Ti.* Cf. Hutchinson 1988 and Tracy 1969. In some ways, Santas is correct in saying that justice in *R.* is better known than health (Santas 2001: 135), but for his contemporary reader this would probably not be the case.

genus, perhaps the one outlined in *Grg.* 464a-465e. Further, he says that virtue is a kind of health of the soul, and vice a kind of sickness of the soul. The analogy that then follows seems a bit compressed, but it seems to say that since having a sick body makes life not worth living, and the soul is more important than the body, then having a vicious soul surely would make one's life not worth living¹⁰⁵. But the use of the analogy in the *Republic* is a bit more developed than that in the *Gorgias*, as Plato in book V adds the division of the soul, and the idea that justice in the soul is the correct ordering between these 3 parts of the soul¹⁰⁶. And this addition, together with his analogy between justice in the soul and justice in the city¹⁰⁷, allows one to go from a concept of justice more like our modern concept of modern health¹⁰⁸ to the concept of being just to others. And then in the *Laws* this is further developed with the division between free and slave doctors, and saying that the true statesman is like the free doctor (*Lg.* 720).

As we have seen, these various analogies based on the analogous relation between care for the body and care for the soul all have the analogical structure that is based on a common genus with a per se attribute. This very common Platonic analogy is thus a good illustration of the type of analogical structure that I am defending.

VI. 3 The expert-analogy in the *Nicomachean Ethics*, in particular the function-argument

Aristotle's *Nicomachean Ethics* contains several expert-analogies¹⁰⁹, and many of them, in particular the function-argument in *EN* I. 7, play an essential role. Still I think the normal interpretation of the expert-analogies is in some respects deficient. Before I discuss the function-argument itself I will discuss the use of the expert-analogy throughout the work. I do

¹⁰⁵ The analogy then seems to be the same as in *Cri.* 47a-48a, which I have discussed above in chapter 2.

¹⁰⁶ Cf, Hall 1971, who criticises Plato's theory in *Grg.* as hedonistic, and as putting no moral responsibility on the moral agent, instead giving all responsibility to the active Statesman who makes the citizens just.

¹⁰⁷ Where of course justice is the common genus that validates the analogy.

¹⁰⁸ Pace Santas 2001: 134.

¹⁰⁹ The expert-analogy is used extensively in other works as well. But I think Angier summarises it well when he says that "whereas his non-ethical writings rarely make use of craft-models in more than a merely illustrative or analogising fashion, it is precisely in his ethics that Aristotle oversteps the limits of this approach, allowing those models to do more of the argumentative work [...]" (Angier 2010: viii)

this because I think it is necessary, in order to understand the function-argument, to realise why it is used in his ethics.

The first thing to realise about Aristotle's use of the expert-analogy is that it is not evenly spread out throughout the work. In fact, his use of expert-analogies is limited to mainly two parts of the work. First, there is the part discussing the end as well as the virtues in general, from *EN* I. 1 to II. 6. Second there is the part discussing the intellectual virtues in *EN* VI. Now there are cases of expert-analogies other places in the work, but there they are far from being as condensed as in those two parts. And perhaps more essentially, in those two parts the expert-analogy plays an essential role, and are key arguments. In contrast, elsewhere in the work the expert-analogies are often merely explicatory or periphery – one might even be tempted, though it should not be taken too far, to think of a remark by Wittgenstein: “a main cause of philosophical disease—a onesided diet: one nourishes one's thinking on only one kind of example.”¹¹⁰ My suggestion is that this feature, viz. that the expert-analogy is used especially in *EN* I. 1 to II 6 and *EN* VI, can be explained by the methodological principle that attributes should be explained at their highest genera, and then moving down to what is more and more specific.

The structure of the *EN* is pretty straightforward, systematic and coherent¹¹¹. It is basically composed of five parts (or possibly five treatises composed by an unknown editor¹¹²): 1) I to VI is on virtue, 2) VII is on self-control and lack of control, 3) VIII and IX is on friendship, 4) X. 1-5 is on pleasure, and 5) X. 6-8 is on happiness. The first part can again be divided into four parts. α) Book one is the introductory part concerned with stating the problem. β) Books II to III. 5 deals with virtue generally. γ) Books. III. 6 to V deals with particular moral virtues. δ) And Book VI deals with intellectual virtues.

One can see that the two parts of *NE* that extensively rely on the expert-analogy are the introductory discussion that states the problems, the general discussion of the virtues, and the discussion of the intellectual virtues. My suggestion is that these parts discuss in many ways the general issues that are common for the virtues as well as the expertise. I.e. the subject of these discussions is often not virtue as such, but a genus of which virtue is a species.

I think this suggestion can be supported by looking at the proposed definition of human good given in *EN* I. 7, and the definition of virtue given in *EN* II. 6. The first is

¹¹⁰ Quoted in Dunne 1997: 310.

¹¹¹ Cf. Lloyd 1968: 202-3.

¹¹² Cf. Pakaluk 2011: 24.

defined when Aristotle says that “human good turns out to be activity of soul [ψυχῆς ἐνέργεια] in conformity with excellence [...]” (EN 1098a16-17) This definition is repeated in EN 1102a5-5 as chapter 13 continues the discussion from chapter 7, the chapters in-between dealing with various objections to this definition. Further, virtue (viz. excellence) is defined in EN II. 5 and 6:

Excellence, then, is a state [ἐξῆς] concerned with choice [προαιρετική], lying in a mean relative to us, this being determined by reason and in the way in which the man of practical wisdom [ὁ φρόνιμος] would determine it. (EN 1106b36-1107a2)

It is then quite clear how virtue is related to the expertise. Virtue is defined as a state (the genus) concerned with choice (the differentia), the differentia being further elaborated after the comma. It is implicit in the discussion in EN II. 6 that expertise is also a state¹¹³, but this is made explicit in EN VI: “art is identical with a state [ἐξῆς] of capacity to make [ποιητική], involving a true course of reasoning.” (EN 1140a9-10) Thus both virtue and expertise shares the same genus, viz. *state* [ἐξῆς], but are not identical in species since virtue has the differentia *concerned with choice* [προαιρετική] while expertise has the differentia *capacity to make* [ποιητική].

Now expertise is perhaps even closer related to practical wisdom [φρόνησις]. “Practical wisdom, then, must be a reasoned and true state of capacity to act with regard to human goods.” (EN 1140b20-21) Both expertise and practical wisdom are a state of true reasoning. It is not evident if this also applies to the moral virtues, although they also in a sense belong to the rational part of the soul. Again the differentia between expertise and practical wisdom is different, in the one a capacity to make and in the other a capacity to act.

At this point I should probably discuss an objection to this interpretation. Particularly in the discussion of practical wisdom Aristotle takes effort to differentiate it from precisely expertise. And even this differentiation is by many interpreters seen as deficient, and they claim that Aristotle was confused by the analogy between practical wisdom and expertise, blind to the serious disanalogies between the two. As an example of this pretty much standard view one can look at Broadie’s discussion:

Since the medical analogy is misleading on this point, the fact that Aristotle reaches for it right at the start suggests a deeply entrenched way of thinking which he has to

¹¹³ *Met.* 1025a6-13 might indicate otherwise, as its description of a capacity as something that can either be used in a good way (its proper use) as well as in a bad way. While a state entails that it is used only for one end. Cf. Irwin 1995: 70-71.

fight to resist. [...] This oblique influence of the analogy upon a philosopher so alive to its flaws is one potential source of obscurity and even incoherence in Aristotle's account of practical wisdom, rational choice, and the ethical *orthos logos*. (Broadie 1991: 191)

Now it is true that there are considerable differences between the various expertise and practical wisdom, both those that Aristotle himself notes and perhaps also the additional differences that Broadie notes. If the analogies are taken to depend on the number of shared attributes, pace Santas, then Broadie's criticism is perfectly valid. And there are strong evidence indicating that Broadie is using this interpretation. E.g. she seems to say that much of the fault is that he uses medicine rather than any other expertise, as other expertise seems to have more attributes in common with practical wisdom: "Were it not for the fact that Aristotle's favourite example of skill in the *Ethics* is his father's craft of medicine¹¹⁴, we might find no difficulty in accepting the analogy of skill with practical knowledge." (Broadie 1991: 197). In contrast, if one is using my proposed structure of the expert-analogy, these differences are inconsequential. The number of similarities is not the issue; the issue is that the attribute being inferred belongs to both practical wisdom and medicine because the attribute belongs per se to a genus that they both belong under. When an attribute does not belong per se to practical wisdom, one uses an analogy to point to the genera where this attribute does belong per se E.g. 1141b14-20, where it is said that in medicine one needs to know both the universal and the particular, both that light meats are digestible and wholesome, and that light meats are e.g. chicken. And it is more important to know the particular, because then one might produce health, compared to knowing the universal. This is a property of medicine because medicine and other expertise is practical, in contrast to theoretical knowledge, and further practical wisdom belongs under this genus as well. Therefore one can infer that the same holds for practical wisdom. But then, when discussing an attribute that does belong per se to practical wisdom, e.g. action in contrast to making in *EN* VI. 4-5, one makes sure to separate practical wisdom from expertise. In this respect they are contraries, while in the analogy they were identical by genus. And again when expertise and practical wisdom is contrasted with theoretical knowledge in *EN* VI. 6, this is to say that

¹¹⁴ In passing it might be noted that Aristotle's use of the medical analogy cannot as easily as some commentators have done be ascribed to his father being a doctor. Aristotle took the medical analogy from Plato, as well as medical concepts such as the mean and state, who again took it from the medical literature. See especially Jaeger 1957, but also Hutchinson 1988, Seidler 1978 and Longrigg 1963.

in this respect the property does not belong to a genus that includes theoretical knowledge, but instead a lower genus.

With this as our foundation, let us go back to the definition of the human good. As it is said to be an activity [ἐνέργεια] one expects there to also be a capacity [δύναμις] which the activity is an actualization of. These two concepts are usually connected to each other in this way in Aristotle¹¹⁵. However, this seems to be in conflict with *EN* II. 5 where it is said that virtue is not a capacity but a state. I think this should be interpreted so that virtue is not merely having the capacity. In fact the three alternatives discussed, passions, faculties, and states, are all related to each other. E.g. “affections are actualizations of capacities and dispositions” (Broadie 2002: 302), i.e. a concrete passion comes about by actualization of a capacity to have this passion as well as a state such that in a certain situation one will have that passion. Such that the state depends on the existence of the capacity, but the state is what ensures that the capacity will be actualized only in the proper situation.

Now what does Aristotle mean with an activity of soul [ψυχῆς ἐνέργεια]? This is clearly a wide term, encompassing much more than the human good alone. This is clear when he separates the activity of the soul characterising human good from the activities shared with other forms of life in 1097b32-1098a4. Life is common with plants, and therefore he excludes the life of nutrition and growth. Likewise perception is common to other animals. So he concluded that the distinctive human good is a *rational activity* of the soul. It would be rational because that is the part of the soul distinctive to man, and an activity because he implicitly assumes that the good cannot be a mere potentiality. This would then at least include moral activity, theoretical activity that gives wisdom, and expertise. It is however common to interpret the wording a bit above in 1098a3-4, “an active life”, so that it and the definition exclusively refers to moral activity, and excluding theoretical activity and expertise¹¹⁶ (cf. Broadie 1991: 36). This reading is however in many ways problematic, leading unnecessarily to more contradiction in the *EN* than what is necessary. Thus it seems preferable, and in better harmony with the text, to here take practical more loosely. From the preceding lines Aristotle makes clear that the activity is not to be taken as one obeying reason, but rather possessing and exercising it – and of these again, the more proper is the exercise of it. Practical then simply means exercising it, rather than simply having the capacity for it.

¹¹⁵ Vide e.g. Kosman 1984, Heinaman 1994 and Gotthelf 1984: 226-7.

¹¹⁶ Cf. Broadie 1991: 36 & 42-50.

As is well known Aristotle entertains the possibility of both moral activity and theoretical activity (*EN* X. 6-8) being the excellence that is human good, but he rejects the possibility that expertise might be this excellence. It is an interesting question why Aristotle rejects the life of expertise, but this is hardly the place to discuss it. It is however highly relevant to see that these three are closely related. As we have seen Plato did not properly divide these three species from each other, all being viewed as some kind of expertise. The division is not always so strict in Aristotle either, and e.g. he describes both logic and rhetoric under the term of expertise. Looking once again at his definition of the human good, he might even be using virtue in a more loose sense, as being good at its function¹¹⁷. And used in this manner, his definition of the human good at this point would still include moral activity, theoretical activity, and expertise. Cf. *EN* 1098a9-12:

[...] if we say a so-and-so have a function which is the same in kind, e.g. a lyre-player and a good lyre-player, and so without qualification in all cases, eminence in respect of excellence being added to the function (for the function of a lyre-player is to play the lyre, and that of a good lyre-player is to do so well) [...]

Let us now try and analyse the function-argument, in particular its structure. The function-argument can be divided into two parts, the first argues that man has a function, and the second arrives at a definition of this function, saying something about what man's function is¹¹⁸. In order not to make this discussion more elaborate than necessary I will confine myself to the first of these arguments, as this is both the most controversial argument and the one that is most obviously an expert-analogy. And I have already made some remarks on the second part of the argument above. The first part of the function-argument can be found in *EN* 1097b24-32, after saying that one needs a clearer account of the chief good:

This might be given, if we could first ascertain the function of man. For just as for a flute-player, a sculptor, or any artist, and, in general, for all things that have a function or activity, the good and the 'well' is thought to reside in the function, so would it seem to be for man, if he has a function. Have the carpenter, then, and the tanner certain functions or activities, and has man none? Is he naturally functionless? Or as eye, hand, foot, and in general each of the parts evidently has a function, may one lay it down that man similarly has a function apart from all these?

¹¹⁷ Cf. Broadie 1991: 37-39. Though he quickly (1099a18-20) moves over to using 'virtue' in the more narrow sense, as moral virtues e.g. justice and generosity.

¹¹⁸ This second argument can again be divided into four parts, cf. Angier 2010: 60-61.

This argument is often taken to contain a fallacy of composition, arguing from what is true of the parts to what is true of the whole, and to be an unwarranted and failed induction. An alternative is to see it as illustrating what a function is, and as such being an intuitive induction¹¹⁹. Once again I think my proposed structure of the expert-analogy allows for a third interpretation.

Now the argument seems to be able to be divided into two separate arguments. One is an expert-analogy while the other argues from organs to man. Let me at first quickly make a suggestion for the argument from organs to man, and afterwards give an interpretation of the expert-analogy. It is unclear how much of Aristotle's biology should be presupposed in this argument. One should presuppose as much as is necessary to make it a good argument, but not more than is necessary. Now I think one must assume that the argument does not claim that the various parts of man each only have one function¹²⁰. Take for instance the hand, which has functions such as gripping and holding, but also locomotion (e.g. a child crawling). Or take the chest, which both has the function of protecting the heart and in females the production of milk (cf. 688a18-25). 'When Aristotle says "nature uses them *as well* for *another* function" at 688a23, he stresses the fact that the female breasts are viewed as *primarily* for this function, and only secondarily as repositories of nourishment.' (Lennox 2001b: 263) I think the argument should be taken to say that the various parts of man, and that man himself, has at least one function. It cannot be taken to say that the various parts of man each only has one function, as this is obviously erroneous. But it does not seem necessary to assume it to say that if a part of man or man himself has more than one function, then one of these functions must be the primary function, although 1098a17-18¹²¹ might indicate that this should be assumed. Thus the argument infers from the parts of man having at least one function each, to the conclusion that man himself must have at least one function. Now I have a suggestion for how this inference works, but this suggestion is but tentative. It is based on a method that Aristotle uses to identify a proprium (ἴδιον) as belonging to a genus, and his assertion that if it is a proprium then for that proprium there is a function:

For an eye is for something, while being blue is not, unless (*plēn*) this affection is a property of the kind. (*GA* V.1 778a33-4)

¹¹⁹ Cf. Broadie 2002: 276 and Angier 2010: 61, both of which presents the two alternatives although both also supports the interpretation that see it as an intuitive induction.

¹²⁰ Cf. Angier 2010: 72.

¹²¹ "[...] and if there are more than one excellence, in conformity with the best and most complete."

Aristotle apparently used the fact that a feature was a property (*idion*) of a biological kind as *prima facie* evidence that it exists for the sake of something. The above suggests that if a kind of animal were universally blue-eyed, being blue-eyed would in all likelihood have functional value. To take another example, while most forms of clawed crustacea have the right claw larger than the left, one group has the larger claw randomly distributed. Aristotle offers a teleological explanation for the difference in the former cases, but in the latter treats the size variation as a matter of chance, and not for the sake of anything (*PA* IV.8 684a25-32). (Lennox 2001b: 176)

Now this suggestion assumes a considerable part of Aristotle's teleology, and an interpretation that assumes less would be preferable. Still, I think using this suggestion might still be preferable compared to an interpretation where Aristotle commits a fallacy of composition. There is of course no necessity that Aristotle always was a perfect logician, but it is much more charitable to prefer to avoid too obvious logical fallacies. Now using my suggestion the argument looks something like this: 1) Every part of man has at least one function. 2) If an attribute is present in all the particulars of a universal, then this is evidence that this attribute is a *proprium*. 3) If something is a *proprium*, then the presence of that *proprium* has in all likelihood a function. 4) Thus, because it is a *proprium* that every part of man has at least one function, then that *proprium* in all likelihood has a function. This way one would avoid the fallacy of composition, as one does not infer from all the parts having a function *directly* to the conclusion that man has a function. I.e. one does not infer that because each part has a function, therefore the whole must have a function. Rather one first infers that having a function belongs as a *proprium* to all parts of man. Then, since this *proprium* must have a function as it is not a matter of chance, man has a function. The reader may judge for himself how successful this interpretation is, but as I said it is but a tentative suggestion.

Now on the other part of the argument, namely the expert-analogy. If this analogy has the type of structure that I have defended, then there must be some genus which both the function of the various expertise and the function of man falls under. Again it is not clear how much one should read into the analogy. Directly following the analogy is the biological argument excluding the life of nutrition and growth, as well as the life of perception. I think it is reasonable to assume that these activities also fall under the genus that we are looking for, as they are possible functions of man. And the same applies to his actual answer, namely that it is an activity of soul in conformity with excellence. Now looking at this various things, it is clear that they are at least all forms of activity of the soul. Nutrition and growth are part of the

soul (in Aristotle's meaning of the term), as is perception, and as is the various expertise. Excellence, though perhaps applicable to the expertise¹²², does not seem applicable to e.g. nutrition, and therefore this does not seem to be a part of the common genus. On the other side, restricting it to activity, without the addition that it is 'of the soul', seems wider than necessary. The genus would then include any form of activity, e.g. the sun heating a rock, but it is not clear that such an activity has a function, and Aristotle's teleology is not necessarily applicable to such an occurrence. The best interpretation is then that the genus is 'activity of the soul.' Now the expert is "an agent who is devoted, paradigmatically, to a single activity, and an activity, moreover, which is specialized in nature." (Angier 2010: 74) Put differently, an expert is engaged in a single activity of the soul, e.g. flute-playing, and this single activity has a function. Now if an expertise has a single function because it is an activity of the soul, i.e. it belongs under the genus 'activity of the soul', and the human good also belongs under the genus 'activity of the soul', then the argument has the valid deductive structure that I am defending. Now the premise that might be doubted here is the one saying that the proprium of having a function belongs to the genus 'activity of the soul'. But I think this premise follows from Aristotle's teleology, more particularly the principle stated above in the discussion of the argument from parts of man. If there is an activity common among the whole group, e.g. perception is common to all animals, or flute-playing is common to all flute-players, then this activity must have a function. As Reeve notes, Aristotle also thinks that function is co-dependent with activity, so that a lack of function implies inactivity¹²³. Again I think this at the very least is a better interpretation than saying that it is a bad induction based on an insufficient number of cases. Taken like this it is a perfectly valid argument, though it has the deficiency that it is dependent on Aristotle's teleology¹²⁴. It would also be possible, pace Angier, to downplay the argument from parts of man and emphasise the expert-analogy – only this would not in any degree decrease the reliance on teleology, although I agree that the expert-analogy is a slightly better argument than the other one¹²⁵. At the same time, this interpretation is perhaps less dependent on teleology than a pure teleological interpretation, and such a pure teleological interpretation that does not include the expert-analogy as

¹²² Expertise is often treated as an intellectual virtue, e.g. Meyer 2008: 186.

¹²³ Cf. Reeve 1992: 124.

¹²⁴ Though his teleology is usually also taken to be a necessary presupposition to the other part of the function-argument, viz. that arrives at the definition. Cf. Santas 2001: 236-250. If it is true that his teleology must be presupposed for this part of the function-argument, it is natural to assume that one can presuppose it for the first part of the function-argument as well.

¹²⁵ In particular Angier emphasizes that Aristotle takes the function-argument from Plato's *R.* 352d-354a, but that he adds the references to the various expertise. Cf. Angier 2010: 78.

suggested by me above does not seem as explanatory as one that is based on the expert-analogy¹²⁶.

¹²⁶ For a pure teleological interpretation, see Lawrence 2011.

VII Conclusion

It would beyond doubt have been of interest to study many more of the expert-analogies, the implications of these interpretations, in what respect the analogies proposed are actually accepted by Plato¹²⁷ and Aristotle, etc. Unfortunately this cannot be a comprehensive study of the expert-analogy.

This thesis has limited itself to defending a new interpretation of the expert-analogy, where the analogy is seen to have a valid deductive structure. It argues from one or more species to another species, and the attribute inferred is presupposed to belong per se to the genus and only accidentally to the species. An indication of this structure was found in Plato, and it was argued that the structure could be found in Aristotle's discussion of the paradigm. Further, a justification of this form of analogy was found in Aristotle's discussion of identity in genus, as well as his methodological principle that an explanation should be given at the highest genera.

However, it was still thought that the proposed interpretation of the expert-analogy needed further evidential support. This was done by discussing three separate types of expert-analogies, where these were especially selected as the analogies are usually seen to be logically or philosophically problematic. I hope to have shown that it makes sense to interpret these such that they exhibit the type of analogy that I have been defending.

The motivation throughout this thesis has been to attempt to make (Xenophon's and) Plato's and Aristotle's use of analogies more consistent, particularly for Aristotle, with the view of them as being good logical philosophers. Unquestionably one will be able to find logical faults in their writings. But if by interpreting the expert-analogy differently one is able to interpret some of these without there being any logical faults, it would be highly preferable, and could deepen our understanding.

But our thesis has perhaps shown even more than that. This thesis, as well as the problems discussed in it, begun with Richard Robinson. His was the first study on the form of the expert-analogy; his terminology has been with us throughout this thesis; and so it is perhaps fitting that the thesis should end on him as well. Robinson says the following in the preface to the second edition:

¹²⁷ On this issue see especially Irwin 1995, Roochnik 1992 & 1996.

This view, that logical truths are obvious and always have been obvious, entails that anyone who at any time in the past denied or disregarded any of these truths must have been stupid. Hence, when I say that Plato held a view of logic disagreeing with a view prevailing today, my creationist critics take me as saying that Plato was stupid. Thus Professor Wild wrote of 'agreeing with ... Robinson that Plato was a very bad logician' [...] But I did not say that Plato was a very bad logician, and I hold that he was a very great logician. Greatness in science consists mainly in leaving the subject much more advanced than when you entered it. It does not consist mainly in holding the same views as a majority of men will hold at a later date, or even in holding true views. (Robinson 1953: vi)

May one be as bold as to say, providing the proposed structure of the expert-analogy here defended is true, that Socrates and Plato and Aristotle must be said to be greater logicians than previously thought? If they developed this logically valid form of analogy, or perhaps the honour should be given to Socrates alone, then they certainly advanced the field of logic even more than previously thought.

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